University of Alberta

Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity

by

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ABSTRACT

Unintended effects of adolescent-targeted obesity prevention public service advertisements (PSAs) and health focused message effectiveness were examined.

Preliminary research gathered obesity prevention PSAs and involved focus testing (*N*=13) as well as questionnaire pre-testing (*N*=10) with adolescents. A pre-post experiment (*N*=95) exposed adolescents to PSA categories and measured unintended effects, ad evaluation, as well as behaviour intention.

Body-image PSAs compared to control increased anxiety: no main effect, significant planned comparisons (large effect size .79) were found. Control PSAs were rated poorly compared to other conditions, while health PSAs were more readable than body-image (*d* =.98) and non health (*d* = .85). Health PSAs versus control showed healthy eating planning (*d* = .93). No significant weight attitude, self-esteem, and stages of change PSA differences were found. Gender significant differences were also found.

Obesity prevention body-image PSAs may increase anxiety, while health PSAs were more readable and caused healthy eating planning among adolescents.

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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION ... 1

The Obesity Epidemic ... 1

Objectives and Hypothesis ... 2

Overall Goals ... 3

CHAPTER 2: LITERATURE REVIEW ... 4

Child and Adolescent Measures of Obesity ... 4

Prevalence of Obesity among Canadian Adolescents ... 4

Costs of Obesity ... 7

Causes of Obesity ... 7

Defining the Target Audience ... 15

Preventive Interventions for Obesity ... 16

Research Questions ... 20

CHAPTER 3: METHODS ... 21

Participants ... 21

Materials ... 22

Procedure and Design ... 26

CHAPTER 4: RESULTS ... 32

Study Objectives ... 32

Preliminary Analysis: Phase I Exploratory and Phase II Pre-Test Results ... 32

Preliminary Analysis: Phase III Focus Group Results ... 32

Hypothesis Testing: Phase IV Main Experiment Results ... 38

Exploratory Gender Analysis ... 49

CHAPTER 5: DISCUSSION 57
  Summary of Findings 57
  Limitations 64
  Implications 68
CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS 70
  Conclusions 70
  Recommendations for Further Research 70
  Recommendations for Practice 71
REFERENCES 73
APPENDIX A: THESIS DESCRIPTION 97
APPENDIX B: ADOLESCENT RECRUITMENT SLIPS AND POSTERS 99
APPENDIX C: TELEPHONE RECRUITMENT SCRIPT 103
APPENDIX D: CAMPAIGN DETAILS 105
APPENDIX E: ADVERTISEMENT CATEGORY EXAMPLES 107
APPENDIX F: THE STATE SELF-ESTEEM SCALE 108
APPENDIX G: MULTIPLE AFFECTIVE ADJECTIVE CHECK LIST 109
APPENDIX H: ATTITUDES ABOUT WEIGHT AND DIETING 110
APPENDIX I: HEALTHY EATING AND INTENTION SCALES 111
APPENDIX J: STAGES OF CHANGE FORMS 113
APPENDIX K: AD EVALUATION SCALE 115
APPENDIX L: DEMOGRAPHIC QUESTIONNAIRE 119
APPENDIX M: INSTRUMENT DESCRIPTION 122
APPENDIX N: PSA DATA GATHERING METHODS 124

APPENDIX O: COGNITIVE INTERVIEWING GUIDE..125

APPENDIX P: SAMPLE MODERATOR GUIDE...129

APPENDIX Q: CONSENT FORMS...130

APPENDIX R: DEBRIEFING FORMS..148

APPENDIX S: SPSS DATA ENTRY PROCEDURES......................................151

APPENDIX T: PHASE II PRE-TEST RESULTS...152

APPENDIX U: FOCUS GROUP RESULTS...155

LIST OF TABLES

Table 1 Child and Adolescent Sample for the 2005 CCHS Survey.................5

Table 2 Prevalence of Obesity among Canadian Adolescents.......................6

Table 3 Prevalence of Obesity among Canadian Adolescent Girls and Boys..... 6

Table 4 Child and Adolescent Obesity and Fruit and Vegetable Consumption... 9

Table 5 Adolescence Obesity Rates and Weekly Energy Expenditure............. 10

Table 6 Gender Adolescence Obesity Rates and Weekly Energy Expenditure...11

Table 7 Adolescence Obesity Rates and Screen Time..................................12

Table 8 Study Objectives for Primary Analysis or Hypothesis Testing............ 32

Table 9 Randomization: Continuous Demographic Variables....................... 39

Table 10 Randomization: Categorical Demographic Variables...................... 39

Table 11 Randomization: Continuous Dependent Variables...........................40

Table 12 Randomization: Categorical Dependent Variables..........................40

Table 13 Testing Condition and Unintended Effects: Weight Attitude.............. 41

Table 14 Testing Condition and Unintended Effects: Self Esteem.................. 42

Table 15 Testing Condition and Unintended Effects: Mood..........................43

Table 16 Hypothesis Testing for Unintended Effects.................................. 44

Table 17 Testing Condition and Ad Evaluation... 45

Table 18 Testing Condition and Behaviour Intention.................................. 47

Table 19 Testing Condition and Stages of Change.....................................48

Table 20 Hypothesis Testing for Ad Evaluation and Change Intentions............49

Table 21 Testing Condition and Unintended Effects: Gender Weight Attitude.....50

Table 22 Testing Condition and Unintended Effects: Gender Self Esteem..........51

Table 23 Testing Condition and Unintended Effects: Gender Mood................ 52

Table 24 Testing Condition and Gender Ad Evaluation..............................53

Table 25 Testing Condition and Gender Behaviour Intention........................55

LIST OF FIGURES

Figure 1	Data collection research stages for phases 1 – 4	26
Figure 2	Outcome variables and statistical analysis	30
Figure 3	Box plot for weight attitude: fear of fat subscale	41
Figure 4	Box plot for mood change: anxiety subscale	43
Figure 5	Box plots for overall ad evaluation and subscales	45
Figure 6	Pre and post histograms for overall behaviour intention	46
Figure 7	Box plot for healthy eating intention change subscale	48
Figure 8	Box plots for weight attitude in males: willpower subscale	50
Figure 9	Box plots for ad evaluation subscales in males	54
Figure 10	Box plots for ad evaluation and related subscales in females	54
Figure 11	Box plots for behaviour change in males	56

CHAPTER 1: INTRODUCTION

The Obesity Epidemic

Governments and health officials in developed countries around the world have been faced with what the World Health Organization (WHO) defines as *globesity*: a global epidemic of obesity considered to be a public health crisis (Roux & Donaldson, 2004; WHO, 2000). Obesity is defined as, "a condition of excessive body fat that results from a chronic energy imbalance whereby intake exceeds expenditure" (Katzmarzyk, 2002a, p. 1039). Obesity is particularly difficult to treat due to an incomplete understanding of the biology, the wide variety of associated risk factors, and the number of life-threatening diseases to which it has been linked (Lau, 1999).

Canadians are facing an epidemic of obesity costing the economy over 1.8 billion dollars (Birmingham, Muller, Palepu, Spinelli, & Anis, 1999). Public health practitioners and policy makers in Canada consider obesity to be a top health priority and identify a need to develop strategies for the prevention and management of this crisis (Canadian Institute for Health Information [CIHI], 2003; Lau, 1999; Wharry, 2002). Canadian policy-makers have begun taking the necessary steps to address the obesity crisis. For instance, a $300 million Integrated Strategy on Healthy Living and Chronic Disease was announced by the Public Health Agency of Canada that addresses nutrition, physical activity, and healthy weights (Beltrame & Tansey, 2005).

Adolescent Obesity

The direct causes of obesity are cited as poor eating and physical activity habits and the strongest link between obesity and these habits has been found among adolescents (Shields, 2005). The social environment has been discussed as a key contributor to poor adolescent eating habits and declining physical activity patterns over time (Bowman, Gortmaker, Ebbeling, Pereira, & Ludwig, 2004; Shields, 2005).

Poor eating habits of North American adolescents are fuelled by the lack of healthy food choices in Canadian schools (Henry & Garcia, 2004), an abundance of low priced, super-sized meals (French, 2003), and aggressive fast food marketing practices (Kraak & Pelletier, 1998). Likewise, the physical activity habits of North American adolescents are related to the lack of required physical education in schools (Canadian Association for Health, Physical Education, Recreation and Dance [CAHPERD], 2006) and the likelihood for adolescents to engage in screen time activities: watching television, playing video games, or using a computer (Shields, 2005). Evidence that such behaviours predict adulthood obesity (Kemper, Twisk, Koppes & Mechelen, 2001; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997) implies that effective interventions are critical to the health of this important group of Canada's population (Saltos, 1999).

Perspective

Various physical activity and nutrition interventions have been used to address adolescent obesity; such as, individual-based strategies (Dietz & Schoeller, 1982), environmental interventions (French et al., 1997), interventions aimed at policy change (Kaiser Family Foundation, 2004), school-level or community-based interventions (Hoeschler, Evans, Parcel, & Kelder, 2002), and interventions using social marketing principles (Agron, Takada, & Purcell, 2002; Huhman, Heitzler, & Wong, 2004; Mixon, 2001).

Social marketing is one approach based on models of behaviour change and marketing theory that has been applied to reducing obesity by increasing the likelihood for the target group to engage in healthy eating and physical activity practices (Andreasen, 1995; Kotler, Roberto, & Lee, 2002). To date however, few Canadian studies have examined how social marketing can prevent adolescent obesity (Tucker & Irwin, 2005).

One component of social marketing is mass communications efforts, such as print advertising (Kotler et al., 2002). Researchers have argued about the need to gain a better understanding of possible unintended effects of mass communications efforts geared towards obesity; such as, weight concerns, dieting, and eating disorders among adolescents, especially those who are within the normal weight range for their height and stage of growth (O'Dea, 2005).

Several researchers have set up criteria for designing successful social marketing campaigns aimed at adolescent obesity (Mixon, 2001). One guideline is that obesity-relevant messages should not focus on the negative health consequences of obesity, or the positive health consequences of a healthy diet and participation in physical activity, but rather motivationally based messages should be used (Mixon, 2001).

Objectives and Hypothesis

The specific study objectives were to:
1. Identify public service advertisements (PSAs) aimed at obesity prevention among adolescents and group them according to key theoretical characteristics;
2. Explore general reactions to obesity prevention PSAs in adolescent focus groups and validate the groupings;
3. Determine the immediate effects of exposure to obesity prevention PSAs in adolescents grouped according to body-image, health focus, non-health focus and unrelated messages (control condition); and,
4. Identify aspects of the design of the tested PSAs that might inform more effective materials for new social marketing approaches for the prevention or reduction of adolescent obesity.

The study hypotheses were:
1. Obesity prevention body-image focused PSAs would be significantly more likely to induce negative weight attitudes, lower self-esteem and stimulate negative mood

compared to the control condition: PSAs that target health behaviours but are unrelated to those which would reduce or prevent obesity; and,

2. Obesity prevention non-health focused PSAs would receive more positive ad evaluations and result in more change intentions compared with obesity prevention health focused PSAs.

Overall Goals

This study examined the immediate effects (both positive and negative) of print-based PSAs that have been used in campaigns to prevent or reduce adolescent obesity using a randomized pre-post trial. This design controlled for all potential baseline differences across groups and is considered extremely high in internal validity (Swinburn, Gill, & Kumanyika, 2005). A control condition is also employed, which further increased the merit of causal inferences and allowed the researcher to narrow down the effects of obesity-related PSAs aimed at adolescents (Bauman, Smith, Maibach, & Reger-Nash, 2006). The results help inform the design of future multi-disciplinary interventions that use a social marketing approach, namely promotion of healthy eating and active living using print advertising for obesity prevention among adolescent populations.

CHAPTER 2: LITERATURE REVIEW

The current review examines the obesity epidemic in Canada among adolescents. The most recent data in Canada on adolescent obesity is discussed, in conjunction with information about genetics, physical activity, healthy eating, and the social environment as causes of obesity. Obesity prevention and reduction efforts are also presented with a focus on social marketing approaches and effects.

Child and Adolescent Measures of Obesity

Measures of BMI have been adopted as international weight indicators for children and adolescents (Dietz & Bellizzi, 1999, Dietz & Robinson, 1998). Currently, children and adolescents are deemed to be obese if they have a BMI ≥ 95th percentile for age and gender (Dietz & Bellizzi, 1999). Likewise, if children and adolescents have a BMI between the 85th and 95th percentile for age and gender, they are regarded as overweight and at risk for becoming obese (Dietz & Bellizzi, 1999).

Prevalence of Obesity among Canadian Adolescents

Adolescents in Canada are an age group in which obesity rates are rising dramatically. A variety of research has examined the prevalence of obesity among adolescents and Canadian children, revealing similarities and differences across age groups.

Perez (1999) analyzed the findings from a series of National Population Health Surveys in terms of obesity and overweight rates among adolescents' ages 15 to 19 years. Results from this analysis showed that approximately one Canadian adolescent in ten was obese and around 20% of males and 13% of females were overweight.

Statistics Canada (2005) recently released the results of a study of the obesity epidemic in Canada. The Canadian Community Health Survey (CCHS) collected information from 23985 adults, 3669 children and 2515 adolescents between January and December of 2004. Results were compared to the 1978/79 Canada Health Survey, which measured the height and weight of 4340 Canadian children and adolescents, as well as 3622 adults (Torrance, Hooper & Reeder, 2002).

Table 1 provides an age breakdown of the child and adolescent sample size used in the CCHS survey.

Table 1.

Child and Adolescent Sample for the 2005 CCHS Survey

Categories	*n*
Boys (2 to 5 years)	684
Girls (2 to 5 years)	664
Total boys and girls (2 to 5 years)	1348
Boys (6 to 11 years)	1173
Girls (6 to 11 years)	1148
Total boys and girls (6 to 11 years)	2321
Adolescent males (12 to 17 years)	1320
Adolescent females (12 to 17 years)	1195
Total adolescent males and females (12 to 17 years)	2515

Note. From "Overweight Canadian children and adolescents" by M. Shields, 2005, *Nutrition: Findings from the Canadian Community Health Survey,* Cat. No. 82-620-MWE, Ottawa, ON: Statistics Canada. Retrieved July 6, 2005 from http://www.statcan.ca/english/research/82-620-MIE/2005001/pdf/cobesity.pdf

To date, the CCHS study is one of the most recent representations of the obesity epidemic in Canada. The CCHS study also provides an accurate conclusion of overweight and obesity measures of Canadians, since the use of direct measures of respondents' height and weight were employed (Statistics Canada, 2005). For over a decade, the majority of research surveys measured overweight and obesity using self-report (Statistics Canada, 2005). Self-reported measures of height and weight are considered to be less valid and reliable than direct measures, as they tend to underestimate the prevalence of overweight and obesity (Statistics Canada, 2005). The 1978/79 Canada Health Survey, used in the CCHS study to draw longitudinal conclusions, is one of the few other nationally representative studies which also used direct measures (Statistics Canada, 2005).

Results from the recent CCHS study demonstrated that adolescent obesity had increased more than any other comparison group (Shields, 2005). Over the past 25 years, adolescent obesity rates tripled from 3% in 1978/79, to 9% in 2004. When obesity and overweight measures were analysed together, results were even more surprising. Specifically, the overweight and obesity rate among adolescents' ages 12 to 17 years doubled from 14% to 29% between 1978/79 and 2004.

Table 2 provides an overview of these results.

Table 2.

Obesity Prevalence among Canadian Adolescents

Target group	2004		1978/79		Change
	%	*n*	%	*n*[1]	%
Adolescents obese (12 to 17 years)	9	226	3	*	6
Adolescents overweight (12 to 17 years)	20	503	11	*	9
Adolescents overweight or obese (12 to 17 years)	29	729	14	*	15

[1] Sample size not provided.

Note. From "Overweight Canadian children and adolescents" by M. Shields, 2005, *Nutrition: Findings from the Canadian Community Health Survey,* Cat. No. 82-620-MWE, Ottawa, ON: Statistics Canada. Retrieved July 6, 2005 from http://www.statcan.ca/english/research/82-620-MIE/2005001/pdf/cobesity.pdf

The CCHS study also demonstrated that adolescent obesity rates differed between males and females in Canada. In particular, adolescent males were 7% more likely to be overweight or obese (Shields, 2005). Table 3 provides an overview of these results.

Table 3.

Obesity Prevalence among Canadian Adolescent Females and Males

Target group	2004	
	%	*n*
Females		
Females obese (12 to 17 years)	7	84
Females overweight (12 to 17 years)	18	215
Females overweight or obese (12 to 17 years)	25	299
Males		
Males obese (12 to 17 years)	11	145
Males overweight (12 to 17 years)	21	277
Males overweight or obese (12 to 17 years)	32	422

Note. From "Overweight Canadian children and adolescents" by M. Shields, 2005, *Nutrition: Findings from the Canadian Community Health Survey,* Cat. No. 82-620-MWE, Ottawa, ON: Statistics Canada. Retrieved July 6, 2005 from http://www.statcan.ca/english/research/82-620-MIE/2005001/pdf/cobesity.pdf

Costs of Obesity

The obesity epidemic has resulted in medical, economic, psychological and social costs.

Medical Costs

Evidence suggests that overweight and obesity are associated with a variety of health problems; such as, high blood pressure, thyroid disorders, sleep problems, asthma, back problems, cardiovascular diseases, depression, cancer, coronary artery disease, hypertension, type 2 diabetes, gallbladder disease, and osteoarthritis (Katzmarzyk, Perusse, Rao, & Bouchard, 2000; Katzmarzyk, 2002b; Peng, 2004). Moreover, it has been shown that a large portion of Canadians experience health problems due to obesity. Specifically, "almost one-third of Canadians are at an increased risk of disability, disease and premature death because of being obese" (Birmingham et al., 1999, p. 483).

Economic Costs

The economic costs attributed to the obesity epidemic in Canada were discussed in a study conducted by Birmingham et al. (1999). This study specifically measured the direct economic costs related to the treatment of, and research into, obesity in Canada. The occurrence of obesity was studied by looking at the 1994/95 National Population Health Survey. A prevalence-based approach was used to identify the direct costs of hospital care, physician services, health professional services, drugs, health care, and heath research as they related to obesity. It was found that the estimated cost of obesity in Canada during 1997 was over 1.8 billion dollars. Birmingham et al. (1999) indicated that this figure was conservatively low, as it estimated the direct costs of obesity only and did not include indirect costs; such as, the loss in productivity resulting from disability and premature death due to obesity-related illnesses.

Psychological and Social Costs

Obesity is also associated with both psychological and social costs for those who suffer from it (Stunkard & Sobal, 1995). In the case of children and adolescents, they are more likely to experience psychological and social problems due to obesity. Specifically, obese children and adolescents are at a greater risk for suffering from low self-esteem, poor body-image, social marginalization, emotional disturbance, and underachievement in education (Birmingham et al., 1999; Falkner et al., 2001; Stunkard & Sobal, 1995; Tremblay, Inman & Willms, 2000).

Causes of Obesity

Genetics, diet and physical activity have been identified as direct causes of obesity in developed countries. The social environment has been a common factor in explaining the obesity epidemic in Canada.

Genetics

Various research studies have demonstrated that links exist between genetics and obesity. Chagnon et al. (2003) found that genetics contributed approximately 25% to 40% of the variability in body weight composition within a population. As well, these genetic factors interact with environmental factors to produce an increased susceptibility to obesity among vulnerable individuals (Chagnon et al., 2003).

Research findings have shown that among Canadians, the Aboriginal population is also more likely to suffer from obesity (Dyck, Klomp & Tan, 2001). This trend existed for both adults and youths (Taylor, Evers, & McKenna, 2005). Researchers specifically found that the Aboriginal population in Canada had a stronger tendency than other cultural groups to give birth to children with high birth weights (Dyck et al., 2001).

Although a variety of genes have been linked to obesity, no one gene has been consistently associated with BMI to date (Chagnon et al., 2003). This suggests that a single genetic cure for obesity is not likely. As well, the rapid increase in obesity among all age groups experienced in recent years in developed nations cannot be accounted for solely by genetic alterations. Instead, this trend illustrates the significant role that behavioural and environmental factors play in contributing to obesity (Anderson, 2000; Hill, Melanson, & Wyatt, 2000).

Diet

Diet is directly associated with adolescent obesity. The link has been established through food consumption surveys. Unfortunately, few national studies exist in Canada that measure overall food consumption patterns among all age groups. Besides the recent CCHS studies and a national study of Canadian food habits (Starkey, Johnson-Down, & Donald, 2001), the last extensive national survey on food consumption patterns among all age groups dates as far back as the 1970s (Nutrition Canada, 1970).

Fruit and Vegetable Consumption

During adolescence, growth is rapid toward achievement of final height, adult body weight, and skeletal mass (Gong & Heald, 1994). Saltos (1999) argued that adolescents, more than young children have a greater likelihood of not meeting their daily nutritional requirements. Saltos (1999) found that the vast majority of adolescents consumed less than two servings of fruits a day, while 12% of adolescents consumed no fruits in a given day. On the other hand, approximately 50% of children, between 2 to 5 years of age consumed two servings of fruits per day in comparison to only 25% of adolescents (Saltos, 1999).

Findings from the CCHS study revealed that obesity and overweight measures among children and adolescents were linked with diet (Shields, 2005). Children and adolescents who consumed less than three fruits and vegetables per day were 6% more likely to be obese or overweight than those who consumed fruits and vegetables five or more times per day. This association existed when both age and socio-economic status were controlled for. Child and adolescent fruit and vegetable consumption was not reported separately. In addition, a difference between boys and girls fruit and vegetable consumption was not reported. Table 4 provides an overview of these results.

Table 4.

Child and Adolescent Obesity and Fruit and Vegetable Consumption

Target group	Low fruit and vegetable consumption (3/day)		Moderate fruit and vegetable consumption (3 to <5/day)		High fruit and vegetable consumption (>=5/day)	
	%	*n*	%	*n*	%	*n*
Child and adolescents obese (2 to 17 years)	10	131	9	208	6	153
Child and adolescents overweight (2 to 17 years)	19	248	19	439	17	434
Child and adolescents obese or overweight (2 to 17 years)	29	379	28	647	23	587

Note. From "Overweight Canadian children and adolescents" by M. Shields, 2005, *Nutrition: Findings from the Canadian Community Health Survey,* Cat. No. 82-620-MWE, Ottawa, ON: Statistics Canada. Retrieved July 6, 2005 from http://www.statcan.ca/english/research/82-620-MIE/2005001/pdf/cobesity.pdf

A study conducted by Starkey et al. (2001) is the only other national research conducted on the dietary habits of Canadians in over 25 years besides the CCHS. When 543 randomly selected adults and 178 adolescents were surveyed, Canadian adolescents did not meet their nutritional requirements. The predominant source of energy for Canadian adolescents, which also represented a vast majority of their daily fat intake, was from food termed the *other group*. This included: sweetened beverages (soft drinks and fruit drinks), desserts, candies, ice cream bars, potato chips, oils, spreads, etc. Twenty five percent of adolescents' energy intake was from the other group, as well as 30% of their fat intake.

Fast Food Consumption

Studies with North American children and adolescents suggest a link between fast food consumption and obesity. Bowman et al. (2004) studied 6212 children and adolescents, aged 4 to 19 years between 1994, 1996 and 1998 and found that as much as 30% of the sample consumed fast food. This trend existed across age groups, genders, racial groups, and regions in North America. Researchers estimated that this amount was likely to add an extra six pounds to each child per year when energy expenditure was controlled for (Bowman et al., 2004).

When child and adolescent fast food consumers were compared to non fast food consumers, differences existed between total energy intake, and these differences were stronger as children aged (Bowman et al., 2004). For instance, total energy intake was 63 kcal greater per day in fast food consumers' ages 4 to 8 years, 132 kcal greater in fast food consumers ages 9 to 13 years, and 379 kcal greater in fast food consumers ages 14 to 19 years. Fast-food consumers also ate more total fat, saturated fat, carbohydrates, sugars, sugar-sweetened beverages, while they drank less milk, and consumed fewer fruits and non-starchy vegetables (Bowman et al., 2004).

Trends in Adolescent Eating Habits

Unhealthy eating habits are established early in life, and tend to be maintained indefinitely. Furthermore, inappropriate nutrition can have long term negative consequences on the future health of adolescents, particularly with regards to obesity (Gong & Heald, 1994). Research studies have found that in comparison to childhood obesity rates, adolescent obesity was a stronger predictor of adult obesity (Whitaker, Wright, & Pepe, 1997).

Adolescent eating habits are becoming progressively worse. Lytle, Seifert, Greenstein, and McGovern (2000) found that as children aged into adolescence, their consumption of breakfast, fruits, vegetables, and milk decreased, while their soft drink consumption increased. This tendency has occurred at a greater rate over the last 30 years. For instance, studies with North American adolescents found that total milk consumption decreased by 35% between the years of 1965 and 1996, which was accompanied by an increase in soft drink and non-citrus juice consumption (Cavadini, Siega-Riz, & Popkin, 2000). Mixon (2001) cited that nearly three-fourths of adolescent males in North America consumed three 12-ounce cans of soda each day and two-thirds of adolescent females consumed about two cans per day.

Physical Activity

Adolescent Daily Energy Expenditure and Obesity

When the most recent data on physical activity in Canada was examined, research findings revealed a link between obesity and physical activity among adolescents. Specifically, when active and moderately active scores were compared to sedentary scores, adolescent obesity was 4% higher among sedentary adolescents. This relationship did not exist when measures of overweight were taken into account. Table 5 provides an overview of these results.

Table 5.

Adolescence Obesity Rates and Weekly Energy Expenditure

Target group	Active/moderately active (7 to >=14 hours/week)		Sedentary (<7 hours/week)	
	%	*n*	%	*n*
Adolescence obese (12 to 17 years)	8	135	12	100
Adolescence overweight (12 to 17 years)	22	370	16	133
Adolescence obese or overweight (12 to 17 years)	30	505	28	233

Note. From "Overweight Canadian children and adolescents" by M. Shields, 2005, *Nutrition: Findings from the Canadian Community Health Survey,* Cat. No. 82-620-MWE, Ottawa, ON: Statistics Canada. Retrieved July 6, 2005 from http://www.statcan.ca/english/research/82-620-MIE/2005001/pdf/cobesity.pdf

Interestingly, when rates of obesity among adolescent males versus females were examined, daily energy expenditure appeared to be a significant predictor of obesity among males, but not among females. For example, the CCHS study demonstrated that sedentary males were more likely to be obese versus active males (Shields, 2005). This finding persisted when age and socio-economic status was controlled for. However, this trend did not exist when measures of overweight and obesity were taken into account. Table 6 provides an overview of these results.

Table 6.

Gender Adolescence Obesity Rates and Weekly Energy Expenditure

Target group	Active/moderately active (7 to >=14 hours/week)		Sedentary (<7 hours/week)	
	%	*n*	%	*n*
Adolescent females obese (12 to 17 years)	6	43	9	44
Adolescent females overweight (12 to 17 years)	19	135	18	87
Adolescent females obese or overweight (12 to 17 years)	25	177	27	131
Adolescent males obese (12 to 17 years)	9	88	16	55
Adolescent males overweight (12 to 17 years)	24	234	13	45
Adolescent males obese or overweight (12 to 17 years)	33	321	29	100

Note. From "Overweight Canadian children and adolescents" by M. Shields, 2005, *Nutrition: Findings from the Canadian Community Health Survey,* Cat. No. 82-620-MWE, Ottawa, ON: Statistics Canada. Retrieved July 6, 2005 from http://www.statcan.ca/english/research/82-620-MIE/2005001/pdf/cobesity.pdf

Likewise Plotnikoff, Bercovitz, and Loucaides (2004) conducted a study comparing the prevalence of physical inactivity, smoking and overweight/obesity rates among Canadian adolescents in urban and rural schools across Alberta and Ontario. Findings demonstrated that only 57% of adolescents achieved Canada's Physical Activity Guidelines and 26% were classified as sedentary based on daily energy expenditure.

Trends in Adolescent Physical Activity Habits

Participation in physical activity declines during adolescence more than any other time in a child's lifecycle (Leupker, 1999) and this trend exists among both American and Canadian populations (Ross & Pate, 1987; Sallis, 1993; Shephard, 1986). Sallis (1993) estimated that physical activity declines as much as 2% to 3% per year among males ages 10 to 17 years, and between 3% and 7% per year among females. These results are particularly concerning, as physical activity in adolescence is a wide predictor of physical activity in adulthood (Kemper et al, 2001). The same relationship exists between childhood activity levels, but the link is weaker in comparison (Trudeau, Laurencelle, & Shephard, 2004).

Interestingly, the physical activity habits of Canadian adolescents have been related to their habit of watching television, playing video games, or using computers (Shields, 2005). The most recent CCHS study by Statistics Canada found that adolescents who spent 30 or more hours per week in front of a screen were 12% more likely to be obese or overweight in comparison to those who spent less than 10 hours per week in front of a screen (Shields, 2005). This effect persisted when age and socio-economic status were controlled. Table 7 provides an overview of these results.

Table 7.

Adolescence Obesity Rates and Screen Time

Target group	Low screen time (<10 hours/week)		Moderate screen time (10 - <20 hours/week)		Moderately High screen time (20 - <30 hours/week)		High screen time (>=30 hours/week)	
	%	*n*	%	*n*	%	*n*	%	*n*
Adolescents obese (12 to 17 years)	9	55	7	49	11	80	11	51
Adolescents overweight (12 to 17 years)	14	86	22	154	20	146	24	112
Adolescents obese or overweight (12 to 17 years)	23	141	29	203	31	226	35	163

Note. From "Overweight Canadian children and adolescents" by M. Shields, 2005, *Nutrition: Findings from the Canadian Community Health Survey,* Cat. No. 82-620-MWE, Ottawa, ON: Statistics Canada. Retrieved July 6, 2005 from http://www.statcan.ca/english/research/82-620-MIE/2005001/pdf/cobesity.pdf

Consistent with the findings of Shields (2005), Tremblay and Willms (2003) also found evidence to support the link between physical inactivity and obesity. However, their study pertained to children and not adolescents. Specifically, Tremblay and Willms (2003) found that sport and physical activity were negatively associated with measures of overweight (10-24% reduced risk) and obesity (23-43% reduced risk), while screen time activities such as TV watching and video game use were risk factors of overweight (17-44% increased risk) and obesity (10-61% increased risk) among Canadian children.

Social Environment

Several researchers have referred to the social environment when explaining the relationship between both unhealthy eating and low physical activity and obesity.

The School Environment

The school environment has been cited as a cause for poor eating and physical activity among North American adolescents through the lack of healthy food choices available, school curricula, and school location (Henry and Garcia, 2004; Plotnikoff et al., 2004; Taylor et al., 2005).

Lack of Healthy Food Choices.

Research on Canadian school food programs notes the availability of high fat, high sugar, and low nutrient-dense foods and beverages that are largely distributed in vending machines (Taylor et al., 2005). Moreover, the practice of selling high fat and sugary foods occurred more often in junior high and high schools then elementary schools

(Seiders & Petty, 2004). French, Story, and Jeffery (2001) argued that soft drink vending machines were increasingly becoming more available in North American schools. In particular, evidence was found for contracts existing between distributors of unhealthy food products and Canadian schools, especially large urban schools. Henry & Garcia (2004) also found that food and beverage vending machines offering high fat, high sugar choices were becoming more readily available in junior high and high schools in Canada.

Few school nutrition polices exist in Canada (Taylor et al., 2005). Recently, the Canadian soft drink industry announced the removal of all carbonated beverages from vending machines in elementary and junior high schools (Agra Informa Inc., 2004). However, the soft drink companies, belonging to Refreshments Canada, will still distribute popular brands of sports drinks, fruit juices, and iced teas. In addition, this move did not apply to Canadian high schools, leaving the adolescent age group still able to purchase soft drinks at their leisure while in the school setting.

A few Canadian provinces have recently banned the distribution of junk foods in schools in exchange for more nutritious choices, such as fruits and vegetables (Bissett, 2005). Such measures have been implemented in both New Brunswick and Nova Scotia, while British Columbia has announced that junk food in schools will be banned by 2009. However, such developments have not occurred at a large-scale across Canada. For example, Ontario government officials do not have plans for banning junk food in high schools because students are free to leave school property to buy lunches.

School Curricula.

At a curricula-based level, there has been a decreased emphasis on developing food-related skills in Canadian schools, for instance, with changes to Home Economics courses (Taylor et al., 2005).

The physical activity habits of North American adolescents are also related to the lack of required physical education classes in schools (CAHPERD, 2006). Overall, the hours devoted to physical activity in Canadian schools do not meet the recommended daily standards of 150 minutes of physical activity per day. Only 5% of schools in Canada actually meet these recommendations.

With the exception of Quebec and Alberta, physical education is no longer a required course for adolescents (Alberta Education, 2005; CAL, 2002). Alberta's recently implemented requirement of 30 minutes of daily physical activity is an important development; however, this policy only applies to children in grades one through nine not to high school students.

Urban and Rural Schools.

Research studies also indicate that there are differences in overweight and obesity measures based on attendance of Canadian urban versus rural high schools. Specifically, Plotnikoff et al. (2004) have provided evidence to support that there is a significantly higher proportion of overweight adolescent males and obese adolescent females attending urban schools in Canada compared to their rural counterparts.

Food Industry Marketing Practices

The food industry plays a key role in contributing to the eating habits of North American adolescents (Chopra & Darnton-Hill, 2004). The food industry has been specifically criticised for its marketing practices, such as, offering foods low in nutritional value and providing large portion sizes (Chopra & Darnton-Hill, 2004).

Substitution Ingredients.

One of the widely criticized practices of the food industry is the use of substitution ingredients. Chopra & Darnton-Hill (2004) defined substitution ingredients as "the progressive reduction of agricultural products to simple industrial inputs that allows replacement by increasingly non-agricultural components" (p. 1559). While these ingredients are cheaper alternatives they include unhealthy amounts of sugar, salt, fats, and oils.

Recently Canada made progress in the area of substitution ingredients, namely trans fats (Health Canada, 2006). This move was encouraging, as researchers estimated that Canadians have one of the highest intakes of trans fats in the world (Health Canada, 2006). An example of such progress is the decrease in the quantity of trans fats in packaged goods as a result of food manufacturers being forced to label the ingredients in their products. The *Trans Fat Task Force* to the federal Minister of Health announced strategies for reducing trans fats in Canadian foods. These regulations, which are to be finalized by June 2008, stated that all retail food establishments will be required to limit their prepared food to 2% of total trans fat content and their packaged food products to 5% of total trans fat content. The regulations do not ban trans fats completely.

Portion Sizes.

North Americans are exposed to large portion sizes in fast food restaurants, packaged meals, and convenience stores (French et al., 2001). In 1916 the soft drink Coca Cola was sold in 6.5 ounce bottles and by 1950, this 6.5 ounce size accounted for 80% of Coca Cola's total sales. Today, Coca Cola sells 20 and 32 ounce bottles (French et al., 2001). There has also been a notable increase in the amount of super sized offerings in convenience stores (French et al., 2001). For example, the convenience chain 7-Eleven recently undertook marketing initiatives where consumers traded in their 16-ounce "Regular Gulp soda" for a 64-ounce "Double Gulp soda" (Seiders & Petty, 2004, p. 152). This trade in added a total of 400 more calories for only $0.37 extra.

Menu analysis studies have outlined the magnitude of this trend. For example, Nielsen and Popkin (2003) demonstrated that portion sizes in solid foods grew substantially between 1977 and 1996. Specifically, portion sizes of hamburgers increased nearly 23%, french fries grew by 16% and the average portion of salty snacks by 60%. Likewise, Harnack, Jeffery, and Boutelle (2000) found an overall 12% increase in solid food king-sized and queen-sized offerings from 1988 to 1993 when 66 different fast food restaurants menus were analysed.

Individuals are more likely to consume super sized portions of food or beverages in comparison to small offerings, if the price is perceived to be similar for both sizes: an appealing incentive (French, 2003). Apart from portion sizes, the number of fast food restaurants in Canada has increased since 1991. Hawkes (2002) found that McDonald's restaurants in Canada have grown from 642 in 1991, to 1223 in 2001.

Kraak and Pelletier (1998) argued that adolescents are faced with aggressive food marketing practices, particularly by food advertisers. These advertisers know that adolescents have strong buying power and spend billions of dollars annually to influence household purchases. Thus, food advertisers attempt to appeal to adolescents in an effort to gain their brand loyalty and keep them as future consumers.

Adolescents consume the vast majority of their food at fast food restaurants, and this trend has increased over time. Nielsen, Siega-Riz, and Popkin (2002) conducted three nationally representative surveys to determine the overall trends in energy intake by food location and type among North American adolescents and young adults between 1977 and 1996. They found that the proportion of food consumed at fast food restaurants increased over time among adolescents. This trend followed a reduced likelihood for adolescents to eat at home, as food consumption at home decreased from 74% in 1977 to 61% in 1996. The types of food that adolescents consumed outside the home included pizza, cheeseburgers, and salty snacks.

Defining the Target Audience

It is increasingly important for prevention and reduction efforts to define a target audience and further segment this target audience into a unique and niche market to appeal to (Kotler et al., 2002). Segmentation avoids defining a market too broadly and allows prevention and reduction efforts to operate within a limited budget to effectively reach a target audience (Maibach, 2002). One way to segment a target market is to divide the market into mutually exclusive subsets based on key variables, such as age, psychographic or behavioural variables (Andreasen, 1995; Maibach, 2002).

As demonstrated, longitudinal research on obesity in terms of prevalence and causes of obesity suggest that adolescents may be an ideal target group for reducing and preventing Canada's nation-wide obesity epidemic. Researchers also argue that adolescents, particularly younger ones are ideal for obesity prevention and reduction efforts, because they are beginning to make their own lifestyle decisions (Wong et al., 2004). Thus, physical activity and healthy eating promotion efforts can be particularly appealing to this age group as they are starting to establish their own obesity-related behaviour patterns (Saltos, 1999).

Preventive Interventions for Obesity

Social Marketing

One of the common misconceptions about marketing is that it can only be used to sell commercial products and services (Rothschild, 1999). However, researchers have shown that marketing principles can play a fundamental role in helping to solve social problems (Kotler et al., 2002). Yet, many individuals that work in the fields of health and social issue behaviour management are not properly trained in applying marketing principles to social change (Rothschild, 1999). Not only are these individuals left unaware of the promising contributions that marketing principles have to offer social problems, but they are also misinformed about social marketing.

Defining Social Marketing

Two widely known contributors to the field of social marketing are Philip Kotler and Alan Andreasen. Kotler et al. (2002) first coined the term social marketing in 1971 and described the process as a marketing technique that has a profound effect on a social cause, idea, or behaviour. Several other definitions have since been offered to describe social marketing. Andreasen (1995) refined the original notion of social marketing to include the key stages of the process, while emphasizing the importance of voluntary behaviour change. Andreasen (1995) defined social marketing as, "the application of commercial marketing technologies to the analysis, planning, execution, and evaluation of programs designed to influence the voluntary behaviour of target audiences in order to improve their personal welfare and that of their society" (p. 7).

Kotler et al. (2002) further refined the original concept of social marketing to include a consumer-orientated perspective, while also describing the complexities of behaviour change. For example, Kotler et al. (2002) offered the following definition of social marketing, "marketing principles and techniques to influence a target audience to voluntarily accept, reject, modify, or abandon a behaviour for the benefit of individuals, groups, or society as a whole" (Kotler et al., 2002, p. 5).

Using Social Marketing to Address Obesity

Social marketing is best known for its contribution to reducing tobacco use; however, social marketing has also been used to address illicit drug use, sexual health, and most recently obesity (Bauman, 2004). Social marketing focuses on a few groups to achieve efficiency, focuses on behaviour change, offers benefits and reduces barriers to make new behaviours more attractive, and manages the environment to facilitate behaviour change (Deshpande & Basil, 2006). Social marketing also employs communication-persuasion techniques, such as print advertising to promote the new behaviour (Kotler et al., 2002).

Social marketing has been used for over 30 years in international and domestic settings; however, less evidence exists on the effectiveness of the approach or its components for adolescent populations (Thackeray, Neiger, Leonard, Ware, & Stoddard, 2002). Some researchers have noted the potential social marketing can play in helping to influence behaviour change among adolescents to prevent obesity (Mixon, 2001).

Social marketing, which has traditionally addressed individual behaviour change, has evolved into broader applications to facilitate social and environmental health determinants (Grier, & Bryant, 2005). Gregson et al. (2001) suggested that social marketing can address five spheres of influence from the broadest level to the narrowest level: (1) social structure, policy, and systems, (2) community, (3) institutional and organizational, (4) interpersonal, and (5) individual (Gregson et al., 2001). Indeed, examples of successful social marketing campaigns aimed at these different levels have included policy (e.g., Agron et al., 2002; Walter & Agron, 2002), community (e.g., Yancey et al., 2003), institutes and organizations (e.g., Wechsler & Wernick, 1992), and interpersonal (e.g., Wong et al., 2004) spheres of influence, thus demonstrating that social marketing need not be limited solely to individual behaviour change.

Unintended Effects

One risk with mass media prevention efforts is boomerang effects – a greater likelihood for the target audience to exhibit undesirable behaviours (Andreasen, 1995) or suffer other adverse consequences.

Defining Unintended Effects.

Brehm (1966) originally explained boomerang effects by looking at the psychological theory of reactance: when an individual feels their freedom to engage in a particular behaviour is threatened or eliminated, they will be motivated to re-establish the threatened or lost freedom, resulting in an increased likelihood for them to engage in the undesired behaviour.

Evidence of boomerang effects exist in many areas; such as, drug abuse (Fishbein, Hall-Jamieson, Zimmer, Haeften, Nabi, 2002), anti-smoking (Wolburg, 2004), and disordered eating (O'Dea, 2002). For example, Fishbein et al. (2002) examined the perceived effectiveness of 30 antidrug PSAs. Students in grades five though 12 were exposed to six sets of antidrug PSAs and filled out evaluation questionnaires. Students in the control condition viewed a non-drug television program. One third of PSAs to prevent illicit drug use were rated by adolescents as increasing their likelihood of trying or using drugs.

Unintended Effects of Obesity-Related Media Campaigns.

One type of creative strategy used in mass media obesity prevention campaigns is body-image focused communication messages (Kaiser Family Foundation, 2004). O'Dea (2005) notes that these types of efforts may suffer from boomerang effects; such as, weight concerns, dieting, poor self-esteem, disordered eating, and eating disorders among children or adolescents of normal weights who will perceive themselves to be fat. O'Dea (2005) explained that such messages may identify obese individuals as failures and outcasts that need medical treatment. In turn the target audience may seek out extreme measures to avoid this connotation, many of which may eventually lead to further problems such as disordered eating and eating disorders.

O'Dea (2005) argued for the need to examine if harmful or dangerous outcomes can result from obesity prevention messages aimed at adolescents. The argument is that the focus on obesity in developed countries should not exist without acknowledgement of the impact such messages will have on disordered eating and eating disorders. Disordered eating and eating disorders in general are serious public health concerns in Canada and other developed countries (Golden et al., 2003; Tremblay & Willms, 2000). Rates of eating disordered behaviour among children and adolescents are growing rapidly (Canning, Courage, & Frizzell, 2004). A recent Canadian study found that 30% of girls and 25% of boys as young as 10-14 years of age, were dieting to lose weight despite being in a healthy weight range (McVey, Davis, Tweed, & Shaw, 2004; McVey et al., 2005). Moreover, a one-year follow-up study (Field et al., 2001) documented 1% and 6% increases in weight concerns and 1% and 2% increases in constant dieting for boys and girls respectively between 1996 and 1997. These findings are concerning given that eating disordered behaviour during youth can lead to difficulties in normal physical growth and development, and the trigger of weight gain from binge eating (Field, Austin, & Taylor, 2003).

Media exposure has been specifically linked with health risk behaviours in adolescents; such as, violence, risky sexual behaviours, poor body concepts, dieting, disordered eating, substance use attitudes and behaviours, as well as obesity (Burros, 2005; Rich & Bar-on, 2001). For instance, food advertising promotes the consumption of unhealthy foods, thus encouraging adolescents to consume such products (Kaiser Family Foundation, 2007; Taylor et al., 2005). Results of one of the largest studies of media exposure and adolescents showed that food was the largest category of advertising that North American adolescents were exposed to and that adolescents, aged 13-17 years, saw an average of 17 television food ads per day (Kaiser Family Foundation, 2007). These were food ads for candy and snacks (34%), cereal (28%), and fast food (10%). Unfortunately, adolescents saw less than one PSA on fitness or healthy eating per week.

Mass media has been linked with eating disordered problems as well as obesity-related problems (Taylor et al., 2005). Research on media exposure has documented a connection between psychological and behavioural outcomes. Hargreaves and Tiggemann (2003) found that mild body dissatisfaction and drive for thinness was induced with single exposures to media messages, with more substantial effects being cumulative (in women but not men). Repeated exposure to idealized media images reinforced insecurity levels and concerns about appearance, shape, and weight. A widely-cited study of Fijian adolescent females reported that use of vomiting to control weight went from 0% to 11% and unhealthy attitudes toward eating (measured on a standard scale) went from 13% to 29% in just 3 years (1995 to 1998) after the introduction of western television programming in their communities (Becker, 2004). Without a doubt, it is imperative to examine the impact food and exercise-related media exposure has not only on obesity-related problems, but also on disordered eating problems.

Health versus Non-Health Focused Messages

The well-documented relationship between obesity and chronic disease indicates a need to encourage adolescents to make eating and activity decisions that will reduce their risk of developing these diseases (Mixon, 2001). While health professionals know that certain behaviours lead to disease, simply telling adolescents the health consequences of certain actions may not be the most effective method to change their behaviour.

Criteria for Successful Social Marketing Messages.

Interestingly, successful social marketing messages aimed at adolescents should focus on concepts that resonate with their desires, values, and behaviours. Likewise, obesity prevention and reduction messages should not focus on the consequences of physical inactivity and unhealthy eating (Mixon, 2001).

Evidence for effective prevention strategies from tobacco use prevention research may be applicable to obesity prevention, particularly for mass media campaigns geared towards adolescents (Chopra & Darnton-Hill, 2004). Many and varied media campaigns to prevent smoking initiation have been designed for this age group due to the high prevalence of smoking risk behaviour (Beaudoin, 2002; Siegel, 1998). Researchers have found that social marketing advertisements geared towards adolescent smoking habits were ineffective if they included information about the short or long term health consequences of smoking (Pechmann & Reibling, 2000). Instead, motivational messages, reflecting social norms, were more appealing to adolescents.

Several explanations have been offered as to why health-specific messages are not appealing to adolescents. In the area of healthy eating, adolescents generally shun the notion of messages that portray mom approved, healthy foods (Fawcett, 2000). Researchers believe that this allows adolescents to evoke feelings of rebelliousness and irreverence. This is also consistent with the findings of Coleman and Henry (1999) that during the adolescent years, individuals were at an increased likelihood to engage in risk taking behaviours.

Adolescent populations are also theorized to be more motivated to engage in or adopt a new behaviour if that behaviour is attached to an immediate versus longer-term reward (Fawcett, 2000; Mixon, 2001). Witte (1997) argued that immediate benefits of a desired behaviour are the type of reinforcement that supports cognitive processing, interest, and involvement in a message. In the case of adolescents, long term health-related rewards are not appealing because adolescents tend to feel invulnerable to long term health risks with the premise that they can engage in healthy behaviours in the future to avoid such problems (Pechmann & Ratneshwar, 1994). This may explain why messages geared towards the health benefits of healthy eating/active living or the consequences of obesity, particularly long term ones, may not appeal to adolescents.

The social reward of being able to fit in with peers and belong to a group is an example of an immediate reward that is relevant to adolescents (Ebenkamp, 1999; Goldstein, 1999). Adolescents are particularly influenced by their peers in terms of their food and physical activity choices (Anderssen & Wold, 1992; Kassem & Lee, 2004; Kohl & Hobbs, 1998). One successful US-based social marketing campaign geared towards the prevention of adolescent obesity is the physical activity based VERB campaign. This campaign did not use messages geared towards the short or long term health benefits of physical activity, but rather identified physical activity as a socially appealing behaviour (Huhman et al., 2004). By doing so, young adolescents were able to identify with the message and incorporate their beliefs about physical activity into a meaningful and identifiable behaviour (Huhman et al., 2004). Longitudinal evaluation results of the VERB campaign found that upon comparison of measures taken before and after campaign promotions, 74% of adolescents surveyed were aware of the campaign and levels of reported sessions of free time physical activity had increased between pre and post exposure. These results where cumulative: as campaign awareness increased among adolescents, so did their level of free time physical activity sessions (Huhman et al., 2004).

Canadian Interventions

Encouragingly, Canada recently released an updated food guide (Duchesne & Waddell, 2007). The food guide includes multi-media components that specifically appeal to adolescents, such as an interactive website that allow users to personalize their information according to age, sex, food preferences, and culture.

Veugelers and Fitzgerald (2005) noted that while a number of Canadian programs and policies have been put forth to address healthy eating and active living among adolescents, further research surrounding their effectiveness is required. Bauman et al. (2006) argued that increased awareness of the perceived relevance of key determinants of obesity in communities, among decision makers, professionals, and for key subgroups is critical. M~~oreover,~~ the use of mass-media prevention efforts can play a key role.

Regardless of the type of intervention or policy used for obesity prevention and reduction efforts, a coordinated and multi-disciplinary approach versus an isolated approach to preventing and reducing adolescent obesity should be employed (Hoeschler et al., 2002). Mass media incentives alone have resulted in behavioural changes in the 5-9% range (Snyder & Hamilton, 2002).

Research Questions

The current research contributes to broader research questions related to the use of social marketing for obesity prevention efforts with adolescents:

1. How effective is social marketing as a behaviour change tool for adolescent obesity?
2. Do social marketing messages have unintended effects on targeted audiences including adolescents?
3. Should social marketing campaigns geared towards adolescent obesity prevention incorporate the use of health or non-health focused messages?

CHAPTER 3: METHODS

Participants

All participants were recruited using systematic snowball sampling (Bernard, 1999) and public advertising. Systematic snowball sampling involves contacting one or more individuals about potential research candidates, who offer contact information for potential participants in their organizations or networks. It is useful when trying to contact key individuals who are difficult to find (Bernard, 1999). For the current study, adolescents in youth groups were targeted. First, a Youth Strategy Coordinator working extensively with adolescent youth groups from the Calgary Health Region was consulted about effective recruitment methods. An email was sent by the Coordinator to Calgary youth organizations with a study description and the researchers' contact details (Appendix A). Several youth organizations responded to this email and assisted with recruitment. Adolescents were recruited for three study components.

For preliminary research (pre-testing and focus groups) adolescents were recruited on two occasions. For the pre-test, adolescents were recruited through the researcher's personal network and told that they did not need to fill out the instruments using real responses, just provide general feedback for the questions. For the focus groups, the researcher passed out recruitment slips and posters (Appendix B) at participating community centers and spoke to adolescents. Those listening to the appeal were given a small token (note pads, coloured pens, key chains, or stickers). Interested adolescents were provided with an opportunity for the researcher to contact them to schedule their participation. Some adolescents were recruited through the researcher's personal network.

For the main experiment (hypothesis testing), youth group Team Leaders distributed recruitment slips, posters, and tokens to community centre adolescents. Those interested were given the researcher's contact details. Recruitment slips and posters were also posted and passed out at recreation institutions. Appointments and study information were given to adolescents, parents, or practitioners and those interested were scheduled to attend a research session using a standard telephone recruitment script (Appendix C). For the main experiment, a few teachers from educational institutes contacted the researcher.

Description

Pre-test participants were 10 adolescents (six females and four males) between 13 to 17 years. Focus group participants were 13 adolescents (six females and seven males) between 14 to 17 years. Main experiment participants were 95 adolescents (45 males and 50 females) between 12 to 18 years from various socio-economic backgrounds.

Materials

Obesity Prevention Print PSAs

Sixteen obesity prevention print PSAs were used, based on different groupings, of which four existed per group. For campaign details and example ads, consult Appendices D-E.

The following groups existed:
1. *Body-image focused*: The PSA portrayed the notion of ideal body types or implied that there was an ideal body weight or shape;
2. *Health focused:* In the PSA either the health benefits of active living and/or healthy eating or the health risk of obesity were mentioned;
3. *Non-health focused:* In the PSA, there was no mention of health benefits of active living and/or healthy eating, but rather the social and fun aspects of active living and/or healthy eating were portrayed; and,
4. *Control*: The PSA focused on health promoting behaviours (e.g., hand washing, sun safety, seat belt use, and adolescent volunteerism) but did not address active living or healthy eating.

Questionnaires

Questionnaires measured adverse effects, change intentions and ad evaluation.

Adverse Effects

Adverse effects were measured using the State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991), the Multiple Affect Adjective Check List (MAACL; Zuckerman & Lubin, 1965, 1985), and the Attitudes about Weight and Dieting Scale (AAWAD; Crandall, 1994). These scales measured immediate PSA effects.

State Self-Esteem Scale.

The SSES (Heatherton & Polivy, 1991) is a self-esteem scale designed to measure short-lived changes in an individuals' self-esteem (Appendix F). The scale measured three factors: academic performance, social evaluation, and appearance. The SESS is ideal for experimental settings when temporary fluctuations in state self-esteem are being measured in comparison to more stable measures of overall trait self-esteem. Although traditional measures of trait self-esteem were considered for the current study (e.g., Coopersmith Self-Esteem Inventory, Coopersmith, 1967, 1981; the Rosenberg Self-Esteem Scale, Rosenberg, 1965, 1979) research suggested that the stable component of trait self esteem is a different construct than the fluctuating nature of state self-esteem (Heatherton & Polivy, 1991). As well, the presence of an appearance sub-scale in the SSES was particularly appropriate for measuring the hypothesized effects of this study.

The SSES was originally used with adult populations of college students; however, evidence existed supported its utility for adolescent populations as well (Linton &

Marriott, 1996). The SSES is a 20-item, 5-point Likert scale where 1 = "not at all" and 5 = "extremely". The maximum score is 100 (indicating high self-esteem). The SSES is internally reliable: when tested among 102 undergraduate Canadian men (*n*=30) and women (*n*=72), coefficient alpha for the whole scale was .92 ($\alpha = .92$). The scale was also deemed psychometrically sound in factor structure and content, construct, and discriminative validity (Heatherton & Polivy, 1991).

Multiple Affect Adjective Check List.

The MAACL (Appendix G) measured state changes in negative mood and, in particular, three types of negative mood effects: anxiety, depression, and hostility (Zuckerman & Lubin, 1965, 1985). Other scales were examined but not selected because they either measured trait negative effects (e.g., Beck Depression Inventory-II, Beck, Steer, & Brown, 1996) or did not meet reliability and validity requirements (Profile of Mood States, McNair, Lorr, & Droppleman, 1971).

All MAACL words are at or below eighth grade reading level and the scale has been used with adolescents (Zuckerman & Lubin, 1965, 1985). The MMACL has 132-items containing words describing different moods. Each word relates to being anxious, depressed, or hostile and their antonyms. Words describing being anxious, depressed, or hostile are considered plus items and scored if the subject does check them, while opposite words (antonyms) are negative items and scored if a subject does not check them. Several words are neutral and not scored. The highest score is 21 for the anxiety sub scale (indicating high anxiety), 40 for the depression sub scale (indicating high depression), and 30 for the hostility sub scale (indicating high hostility). The MAACL is internally reliable. When tested among 746 adolescents, coefficient alpha for the anxiety scale was .69 ($\alpha = .69$), .79 for the depression scale ($\alpha = .79$), and .80 for the hostility scale ($\alpha = .80$). The scale met convergent and discriminant validity requirements (Zuckerman & Lubin, 1965, 1985).

The Attitudes about Weight and Dieting Scale.

The AAWAD (Appendix H) measured three dimensions: dislike (degree of negative feelings about fat people), fear of fat, and willpower (beliefs about the degree to which an overweight person is perceived as responsible for being overweight). Several body satisfaction scales were reviewed (e.g., The Body Shape Questionnaire, Cooper, Taylor, Cooper, & Fairburn, 1987; The Body Dissatisfaction Scale, Garner, Olmstead, & Polivy, 1983; The Body Perception Scale, Secord & Jourard, 1953); however, not appropriate because they pertained only to females or eating disordered females, assessed trait body satisfaction, or were considered too direct in asking participants to rate body parts.

The AAWAD has been administered to undergraduate university students and is suitable for both genders (Crandall, 1994). The AAWAD consists of 13 items measuring anti-fat attitudes on a 10-point Likert scale where 0 = "strongly disagree" and 9 = "strongly agree". Higher scores indicate more negative weight attitudes. Each scale is scored by summing pertinent items and dividing by the total number of items. The AWWAD is internally reliable. When tested among 251 undergraduate students, coefficient alpha for the dislike factor was .84 (α = .84), .79 for the fear of fat factor (α = .79), and .66 for the willpower factor (α = .66). It was also valid, correlating with other attitude measures (Crandall, 1994).

Change Intentions and Advertisement Evaluation

Change intentions were measured using the Healthy Eating and Physical Activity Intention Scales (Baker et al., 2003) and the Healthy Eating and Physical Activity: Stages of Change Short Forms (Prochaska, 1991). Advertisement likeability was examined using the Ad Evaluation Scale (Kelly, Stanley, Comello, & Gonzalez, 2006).

Healthy Eating and Physical Activity Intention Scales.

The healthy eating and physical activity intention scales (Appendix I) were originally designed as measures of behaviour intention based on the Theory of Planned Behaviour (TPB; Ajzen, 1998, 1991). The TPB posits that attitudes, perceived social norms, and perceived behavioural control predict behavioural intentions, which influence behaviour. Although alternative measures of healthy eating and physical activity intention were examined (Birnbaum et al., 2002; Dutta-Bergman, 2005, Fila & Smith, 2006; Mummery, Spence & Hudec, 2000; Rhodes, & Matheson, 2005; Rivis, & Sheeran, 2003) they were not considered appropriate for recall and reactivity reasons (e.g., some were too long in length, while others were too short or not as developed psychometrically).

Both intention scales include four items, whereby healthy eating or physical activity intention are measured using two planning and two expectation dimensions (Baker et al., 2003). A 6-point Likert scale is used, where 1 = "strongly disagree" and 6 = "strongly agree" for the planning dimension and 1 = "very unlikely" and 6 = "very likely" for the expectation dimension. Higher scores indicate greater behaviour intention. The scales were developed with North American adolescents and are internally reliable. When tested among 279 adolescents, the scales demonstrated .91 coefficient alpha for eating intention (α = .91) and .93 coefficient alpha for physical activity intention (α = .93). The descriptions used in the scales have been examined for face validity with psychologists and psychology students at the Yale Center for Eating and Weight Disorders.

Stages of Change Scales.

The Physical Activity: Stages of Change Short Form (Appendix J) is based on Prochaska and DiClemente's (1983) Stages of Change model and is a useful way for researchers to understand and predict health behaviour change. Based on findings that intention to change was significantly related to actual behaviour change (Martin-Diener, Thuring, Melges, & Martin, 2004), the model suggests that individuals who engage in a new behaviour will move in an orderly progression through stages: *Precontemplation* (no intention to change behaviour), *Contemplation* (intention to change behaviour), *Preparation* (begin making small changes to prepare for the larger behaviour change), *Action* (involvement in behaviour change), and *Maintenance* (sustain behaviour change)

(Marcus, Selby, Niaura, & Rossi, 1992). Several scales have been developed using the stages of change model, one of which is the Physical Activity: Stages of Change Form. Although alternative methods to assess exercise and nutritional habits were examined, the majority pertained to current behaviour (e.g., Godin's Leisure Time Exercise Questionnaire, Godin & Shepard, 1985, The Adolescent Food Habits Checklist, Johnson, Wardle, & Griffith, 2002) and not behaviour intention.

The Physical Activity: Stages of Change Short Form is a measure whereby the participant rates one of five choices reflecting intent to exercise. Based on their choice, they are grouped into one of five stages of change according to Prochaska (1991). A modified version of this scale was constructed, specific to healthy eating. Both scales used the same definition of healthy eating and physical activity as the intention scales to maintain consistency and avoid confusion among participants. The scale has been used with adolescent populations, specifically North American adolescents (Berry, Naylor, & Wharf-Higgins, 2005). It had a .78 kappa index of reliability over a two-week period and has been deemed valid in terms of construct validity (Berry et al., 2005).

Ad Evaluation Scale.

The Ad Evaluation Scale (Appendix K) has three constructs: attitude, believability, and readability. These constructs were derived from a study on tobacco counter advertisements in which the authors were able to explain 75% of the variance in overall ad evaluation (Kelly et al., 2006). Several items measure each construct. For instance, attitude toward ad is measured by how cool the ad is, how much the subject likes it, how much the subjects' friends and family would like the ad, and how interesting the ad is. Other scales examined for the purpose of advertisement evaluations (e.g., Haley & Baldiner, 1991) were not deemed statistically robust. For the current purpose, all construct items were included from the Ad Evaluation scale except for the item "My PARENTS wouldn't like it at all – My PARENTS would like it a lot" from the attitude construct. The behaviour component in the believability construct was also adapted to active living/healthy eating.

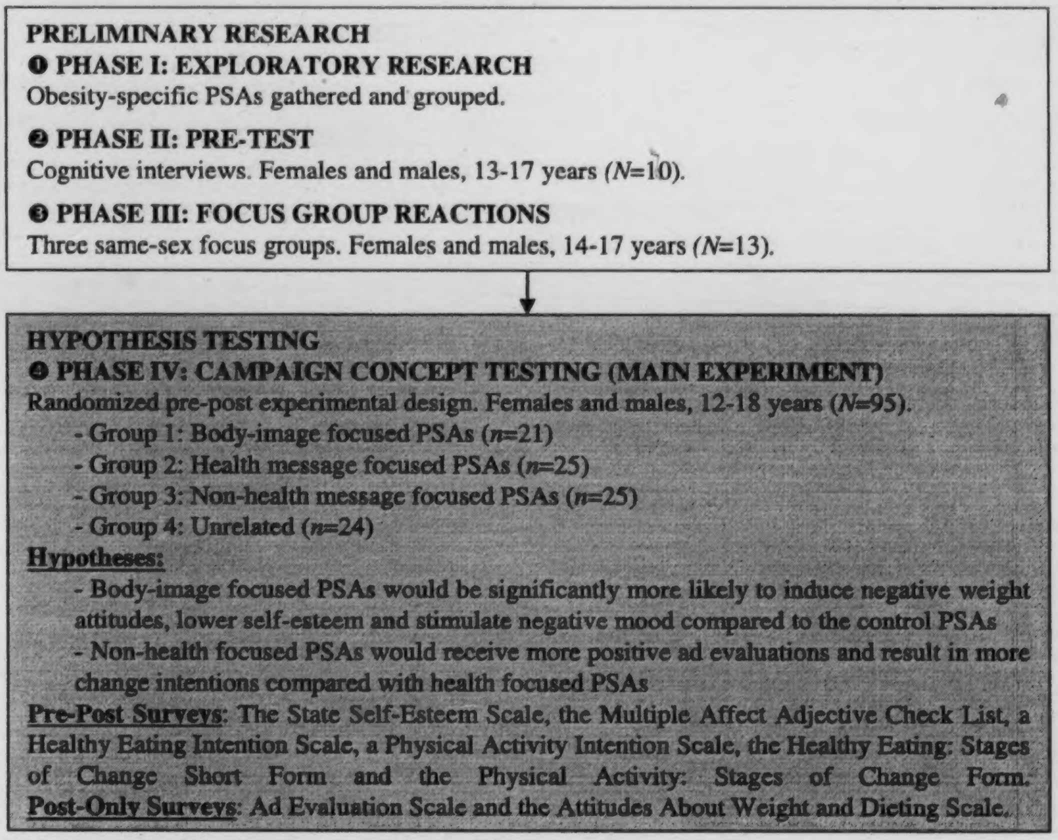
The Ad Evaluation Scale was originally tested with US-based adolescents aged 12 to 14 years. The measure uses a 7-point visual analog scale where higher scores indicate positive attitude, believability, and readability. The Ad Evaluation Scale is internally reliable. When tested among 249 adolescents, the scale showed .91 coefficient alpha for the attitude ($\alpha = .91$), .70 for the believability ($\alpha = .70$), and .86 for the readability ($\alpha = .86$) constructs. Validity information was not provided (Kelly et al., 2006).

Demographic Measures

The questionnaire package contained a demographic questionnaire derived from the CCHS study (Shields, 2005; Appendix L) including age, gender, socioeconomic status, language, birth city, school grade, self-perceived health, screen time, culture, daily fruit and vegetable consumption, and physical activity. Further instrument details can be found in Appendix M.

Procedure and Design

Four research phases were employed, three of which were preliminary research and the last of which included experiment based hypothesis testing. The first phase involved gathering and grouping obesity prevention print PSAs aimed at adolescents and did not involve original participant data collection. The second phase pre-tested the survey instruments using one-on-one cognitive interviews (Collins, 2003; McColl, Meadows, & Barofsky, 2003; Willis, 1999). The third phase involved three focus groups to discuss the strengths, weaknesses and groupings of the obesity prevention print PSAs. The fourth phase, the main experiment, involved randomly assigning adolescents to one of four obesity prevention PSA categories: (a) body-image focused, (b) health message focused, (c) non-health message focused, and (d) unrelated (control). The adolescents completed questionnaires before and after viewing PSAs. Figure 1 depicts data collection stages.



PRELIMINARY RESEARCH
❶ PHASE I: EXPLORATORY RESEARCH
Obesity-specific PSAs gathered and grouped.

❷ PHASE II: PRE-TEST
Cognitive interviews. Females and males, 13-17 years (*N*=10).

❸ PHASE III: FOCUS GROUP REACTIONS
Three same-sex focus groups. Females and males, 14-17 years (*N*=13).

HYPOTHESIS TESTING
❹ PHASE IV: CAMPAIGN CONCEPT TESTING (MAIN EXPERIMENT)
Randomized pre-post experimental design. Females and males, 12-18 years (*N*=95).

- Group 1: Body-image focused PSAs (*n*=21)
- Group 2: Health message focused PSAs (*n*=25)
- Group 3: Non-health message focused PSAs (*n*=25)
- Group 4: Unrelated (*n*=24)

Hypotheses:

- Body-image focused PSAs would be significantly more likely to induce negative weight attitudes, lower self-esteem and stimulate negative mood compared to the control PSAs
- Non-health focused PSAs would receive more positive ad evaluations and result in more change intentions compared with health focused PSAs

Pre-Post Surveys: The State Self-Esteem Scale, the Multiple Affect Adjective Check List, a Healthy Eating Intention Scale, a Physical Activity Intention Scale, the Healthy Eating: Stages of Change Short Form and the Physical Activity: Stages of Change Form.
Post-Only Surveys: Ad Evaluation Scale and the Attitudes About Weight and Dieting Scale.

Figure 1. Data collection research stages for phases 1 - 4.

Data Collection: Phase I Exploratory Research

Systematic snowball sampling was used to gather, review and group English language electronic print ads from other countries of provinces outside of Alberta that addressed adolescent obesity (Bernard, 1999; Wallace & Leenders, 2004). Data suggested that adolescents are readily exposed to print ads (Kaiser Family Foundation, 2005). On any given day, about three quarters of adolescents spend a few minutes reading print media and nearly half spend at least 30 minutes leisure reading.

Obesity Prevention PSAs

Obesity prevention PSAs were gathered from 33 campaigns, of which 15 campaigns and 83 electronic PSAs passed the inclusion criteria: (a) obesity specific strategy using physical activity and/or healthy eating; (b) print-based PSAs accessible, and (c) adolescent target (some campaigns were also geared towards parents and/or children). Campaign PSAs were from the United States, Australia, the United Kingdom, and Canada (Ontario). Materials were grouped into non-health focused, health focused, and body-image focused categories. Several were discarded due to replication, leaving the total sample at 72. All obesity prevention PSAs were further reduced based on conditions held constant across categories: (a) colour ads, (b) real images, (c) minimal text, (d) 8½ x 11 letter size, (e) balance of gender by category, (f) balance of healthy eating/physical activity promotion by category, (f) visuals told a story (e.g., eat healthy, exercise more), (g) spoke to an adolescent audience, and (h) images of different body types. This left the sample of advertisements at 24 (10 campaigns). After focus groups, four PSAs remained in each group for the main experiment.

Control PSAs

Twenty six PSAs geared towards adolescents were gathered from a variety of sources. This group was reduced with the same criteria used for obesity-relevant PSAs, to include four PSAs in the areas of hand washing, sun safety, seat belt use, and adolescent volunteerism. For more information on the processes used to gather PSAs, consult Appendix N.

Data Collection: Phase II Pre-Test

Cognitive Interviewing

Pre-testing can avoid misdirected approaches and identify study problems (Andreasen, 1995). The study instruments were administered to 10 participants (Bernard, 1999) and assessed using cognitive interviewing (Collins, 2003). Cognitive interviewing allowed the researcher to explore the cognitive processes respondents used to answer surveys. Verbal probing was used due to the length of some scales and the relative difficulties of the think aloud approach associated with cognitive interviewing (Collins, 2003; Willis, 1999).

Pre-Test Procedure

Participants filled out a questionnaire package and highlighted difficult to understand words and questions. Beside the highlighted areas they explained their reasoning to the researcher. For the Ad Evaluation Scale, experimental and control PSAs that did not meet the criteria for the main study were used. Additional questions asked during the interviews related to specific questionnaires as well as the appropriateness and comprehension of the wording for selected items. The pre-test allowed the researcher to identify the strengths and weaknesses of the questionnaires and make modifications where warranted before the main study. Notes were taken during all pre-test interviews. Instrument administration times were also measured. Each interview took approximately 60 minutes. Appendix O contains the interviewing guide and a sample questionnaire cover and feedback page.

Data Collection: Phase III Focus Group Research

Focus Group Environment

Focus groups identify the wants, needs, and behaviour influences of the target audience (Thackeray et al., 2002). Focus groups provide a comfortable environment where a wide range of ideas regarding the topic of interest can be discussed, resulting in rich, qualitative data that may not have emerged using other data collection methods (Silk, Parrott, & Dillow, 2003). Focus groups allow ineffective social marketing approaches to be eliminated and media and message preferences of the target audience to be identified, thus providing insights on how to proceed with communication endeavours (Silk et al., 2003; Tucker & Irwin, 2005; Young, Anderson, Beckstrom, Bellow, & Johnson, 2004).

Research Setting and Focus Group Procedure

Focus groups explored initial responses to obesity prevention PSAs, and confirmed groupings defined by the researcher. They also added depth to the interpretation of the experimental findings. Two of three sessions were held at the Child and Youth Friendly community facility, while the third was held at the researcher's home with personal network participants. The first group was held with six females, the second was held with two males, and the third was held with five males. First, adolescents were introduced to the focus group environment as an open, honest, and respectful one. Next, they were shown the main experiment PSAs and asked to assess the strengths and weaknesses of key communication materials. Third, the researcher probed adolescents on whether they agreed/disagreed with key groupings. The following information was gathered: overall reaction, top of mind feelings, main ideas, likes/dislikes, favourite, and agreement towards proposed groupings. Appendix P contains the Moderator guide.

Qualitative Data Analysis

Results obtained from the focus group research were analyzed using *content analysis*. Content analysis functions to identify categories and concepts that can be linked by the researcher to theoretical frameworks (Bernard, 1999).

Content analysis was done in an exploratory manner with understanding of the data emerging during the process, versus specific hypothesis testing. First, the focus groups were audio taped and transcribed. After reading through the transcripts, categories and themes were identified, and textual data was organized into various categories (e.g., PSA main idea) and compared in an attempt to find relations (Bernard, 1999). Categories were grouped into overall themes and sub themes where possible. Qualitative summary information and main experiment PSA inclusion were reviewed and validated by two separate senior researchers.

Data Collection: Phase IV Main Experiment

Sample Size Calculation

The first calculation for the unintended effects outcome variable was based on the anxiety subscale of the MAACL because of the sensitive nature of the scale (Chatterton et al., 2000; Zuckerman & Lubin, 1965, 1985). An expected mean score of 52.10, a standard deviation of 12.10, an effect size of 1.00 (using Cohen's *d*; Cohen, 1988), 80% power and an alpha level of .05 were used in the sample size calculation. Calculations for an independent samples t-test and for a one-way ANOVA both indicated a minimum of 16 participants would be needed for an effect size of 1.00 (Brant, 2006; York University, 2006). The second calculation for the behaviour intention outcome variable was based on an aggregate score on the Healthy Eating and Physical Activity Intention Scales (Baker, et al., 2003). An expected mean score of 4.40, a standard deviation of 1.30, an effect size of 1.00 (using Cohen's *d*; Cohen, 1988), 80% power and a .05 alpha level were used to estimate sample size. Estimates for an independent samples t-test and for a one-way ANOVA both indicated a minimum of 16 participants were needed per condition (Brant, 2006; York University, 2006).

Randomization

Each participant (*N*=95*)* was assigned to one of four groups exposed to four print obesity prevention PSAs: (a) body-image focused, (b) health focused, (c) non-health focused, or (d) control. Random assignment was done for the testing condition and PSA order (controlling for primacy and recency effects) by placing random numbers from one through four (representing testing condition and PSA order) in a sealed envelope. Prior to the experiment, the researcher picked a number and wrote down the condition and PSA order.

Research Setting and Experimental Procedure

The experimental intervention took place at participating community facilities and educational institutions. In a group setting with approximately eight participants at a time, a randomized pre-post experimental design compared obesity prevention PSAs in initial grouping and assessed their short term effects.

At the beginning of the session, participants filled out a questionnaire package containing the SSES (Heatherton & Polivy, 1991), the MAACL (Zuckerman & Lubin, 1965, 1985), Healthy Eating and Physical Activity Intention Scales (Baker et al., 2003), the Physical Activity and Healthy Eating: Stages of Change Short Forms (Prochaska, 1991), and a

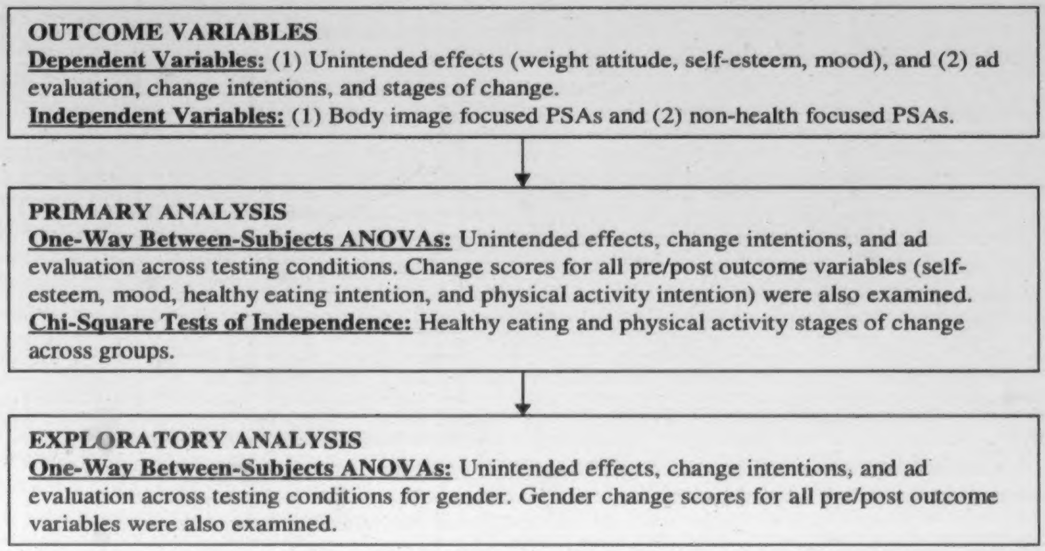
Demographic Questionnaire (Shields, 2005). Subsequently, they were given copies of four PSAs, either obesity prevention or control advertisements based on their designated group. After viewing each ad, they completed the corresponding ad evaluation (Kelly et al., 2006). Ad evaluations took approximately 10 minutes to complete. After all ad evaluations had been done, the questionnaire package was re-administered, with the addition of the AAWAD (Crandall, 1994) and excluding demographic questions.

Data Cleaning

Data from all questionnaires were entered by two research assistants and accuracy checks were done on over 80% of the data with any entry errors corrected. Missing data for open-ended demographic questions were treated as "don't know" and assigned a numeric value. When participants circled more than one answer for culture, they were assigned a new category (multi) and a numeric value. Two variables were added for neighbourhood: persons in low income homes and median household income based on Calgary community profiles (City of Calgary, 2007). A few profiles were unavailable because participants resided outside of the city of Calgary limits or in new communities. Blank answers in the SSES (2 participants) and Ad Evaluation (2 participants) were dropped from analysis. For the stages of change scales, a conservative assumption was made for those answering more than one stage and their responses were coded in the lowest stage. For the AAWAD scale, a small amount of data was missing (2 participants) of which missing values were replaced with mean scores.

Main Experiment Data Analysis

Initial inspection of the distribution as well as bivariate and exploratory analyses were conducted (Figure 2). For SPSS data entry procedures, consult Appendix S.



OUTCOME VARIABLES
Dependent Variables: (1) Unintended effects (weight attitude, self-esteem, mood), and (2) ad evaluation, change intentions, and stages of change.
Independent Variables: (1) Body image focused PSAs and (2) non-health focused PSAs.

PRIMARY ANALYSIS
One-Way Between-Subjects ANOVAs: Unintended effects, change intentions, and ad evaluation across testing conditions. Change scores for all pre/post outcome variables (self-esteem, mood, healthy eating intention, and physical activity intention) were also examined.
Chi-Square Tests of Independence: Healthy eating and physical activity stages of change across groups.

EXPLORATORY ANALYSIS
One-Way Between-Subjects ANOVAs: Unintended effects, change intentions, and ad evaluation across testing conditions for gender. Gender change scores for all pre/post outcome variables were also examined.

Figure 2. Outcome variables and statistical analysis.

Initial Inspection of the Distribution.

Continuous outcome variables were inspected visually with box plots, histograms, and summary statistics, while categorical variables were inspected with frequencies and percents. All histograms and box plots were inspected to assess normality and homogeneity of variance; however, specific tests of distribution assumptions were not used.

Bivariate Analysis.

Across each condition, one-way between-subjects ANOVAs examined significant differences between testing condition (independent categorical variable) and post measures of unintended effects (weight attitude, self-esteem, mood), change intentions (healthy eating/physical activity), and ad evaluation (dependent continuous variables). To control for equal levels across groups, one-way ANOVAs using score differences (change scores) were also used.

Chi-Square tests of independence examined the relationship between stages of change across groups. The relationship between shifts in reported stages of change (yes/no) and test condition (body-image, health focused, non-health focused and control) was investigated. Two chi-square tests of independence were conducted – one for physical activity shifts in stages of change and the other for healthy eating shifts in stages of change.

Exploratory Analysis.

Across each condition, one-way between-subjects ANOVAs examined significant differences between testing condition and post measures of unintended effects, change intentions, and ad evaluation by gender. To control for unequal levels across groups, one-way ANOVAs using score differences were also done by gender.

Ethics

For all participant data collection phases, adolescents aged 14 years and above or parents of adolescents below 14 years of age signed a relevant consent form (Appendix Q). The wishes of adolescents who did not want to participate (even if their parent had given consent) were respected. Participants who made a special trip (i.e., they were not already present for another activity) to any of the locations were offered reimbursement for public transit or parking costs. At the end of all research phases, the researcher gave a brief explanation of the study and informational resources (Appendix R). All questionnaires were assigned a code number for data entry and analysis to maintain participant confidentiality. Records were kept in a locked filing cabinet which only the researcher and supervisors had access to. Results were sent to those who wished to receive them. The study was reviewed and approved by the Conjoint Health Research Ethics Board at the University of Calgary.

CHAPTER 4: RESULTS

Study Objectives

Each study objective was examined through preliminary analysis or hypothesis testing. Table 8 shows the study objectives and their associated analysis phase.

Table 8.

Study Objectives for Preliminary Analysis or Hypothesis Testing

Objective	Preliminary analysis	Hypothesis testing
Identify PSAs aimed at obesity prevention among adolescents and group according to theoretical characteristics.	Phase I: Exploratory research.	n/a.
Explore general reactions to the PSAs in adolescent focus groups and validate the groupings.	Phase III: Focus group research.	n/a.
Determine the immediate effects of exposure to PSAs in adolescents grouped according to body-image, health focus, non-health focus and unrelated messages.	n/a.	Phase IV: Main experiment.
Identify aspects of the designs of the tested PSAs that might inform more effective materials for new social marketing approaches for the prevention or reduction of adolescent obesity.	Phase III: Focus group research.	Phase IV: Main experiment.

Preliminary Analysis: Phase I Exploratory and Phase II Pre-Test Results

Exploratory research resulted in the researcher grouping obesity prevention PSAs according to body-image, health, non-health, and unrelated (control) groups. Pre-test participants were favourably disposed to the instrument package. After completing the questionnaires, the experience was described as: “easy” (nine participants), “interesting” (six participants), “just long enough” (six participants), “simple” (six participants), and “fun” (two participants). A few described the questionnaire package as “too many similar questions” (three participants) and “confusing” (two participants). Revisions were made to each scale following the pre-test and are summarized in Appendix T.

Preliminary Analysis: Phase III Focus Group Results

Overall, focus group participants had a great deal to discuss regarding physical activity and healthy eating-related print PSAs. Adolescents were able to talk about their overall reactions to the PSAs with ease. The results of this discussion are outlined in terms of key themes extracted from each group as well as reactions to specific obesity prevention PSAs.

Overall Reactions

Participants shown the physical activity and healthy eating PSAs mentioned that they had not been exposed to the ads before. Adolescents seemed to understand the marketing intention and message being portrayed in each PSA. One female participant described how adolescents are accustomed to being marketed to: "as a youth we are so used to TV, internet, and all these things advertised at us. Companies spend so much money marketing to us, so they make really catchy ads".

Main Idea

Participants felt the main ideas of the print PSAs were to eat healthy and exercise, while also acknowledging that the ads were geared towards different ages of adolescents. Adolescents discussed whether obesity prevention PSAs should incorporate physical activity-only messages, healthy eating-only messages or both types of messages. Female participants and a few male participants felt it would be unnecessary to incorporate both activities in obesity prevention PSAs, because they naturally associate one with the other and it would be confusing to show both. They mentioned: "[both behaviours] work hand in hand", "if you just target one and do it really well, that works" and "we are in a time where we know the two go together". If the two behaviours are portrayed in a PSA, adolescents suggested that this be done in a simple and creative way. A female participant gave an example of a successful advertisement she came across at her school, incorporating both activities:

> There is an ad at my school, with a bike, but the wheel is a tomato. Another one there is a person climbing and the rock is grapes, so they replace the activity with fruits and vegetables…that's really original.

Unique Obesity Prevention PSAs

Participants supported humour in obesity prevention PSAs that discussed physical activity and healthy eating, mentioning: "it's good to laugh". When asked which PSAs they found to be unique, both genders mentioned those that portrayed physical activity or healthy eating using unique, out of the ordinary objects in conjunction with humor.

Cultural Diversity

Participants noticed cultural diversity in marketing efforts. One focus group participant noted that the vast majority of ads gathered by the researcher included Caucasian people and pointed out that only a few obesity prevention PSAs portrayed African Americans.

Aesthetic Characteristics

Images

Adolescents felt that visuals were essential in depicting the PSA message and went as far as saying that communication materials which included only text were not appealing. They mentioned: "all of these, generally, they give you a visual of what they are trying to say and I think that's important when trying to deal with youth", and "if you give someone a written thing, they won't read it. I wouldn't. Why would you?". Colourful images were considered eye-catching by participants, and obesity prevention PSAs which used dull colours were not noticed. As one female focus group participant mentioned: "it wouldn't catch my attention. It's not bright and colourful". A male participant also commented: "I like colour. That's a big thing for me. Anything that has bright colours, especially reds or oranges that is the first thing my eye goes towards".

Focus group participants did not like PSAs that used non-realistic cartoons because they felt such ads were geared towards young children. When looking at cartoon PSAs, adolescents made the following comments: "this one is lame. I feel like it's geared towards someone who is ten. It's not necessarily condescending, but not for me" and "it looks really young. It would be smart for elementary kids, but not adolescents or youth per se". Oftentimes, participants were unable to understand PSAs that featured cartoon-like characters of objects. All participants were confused about a PSA featuring a cartoon light switch and perceived it to be a Tetris block or explosion. When asked their preference, cartoon versus real pictures, adolescents noted: "it would work without an abstract picture, but a real picture".

Text

Adolescents found PSAs that contained a brief amount of text beside a brightly coloured visual to be aesthetic and easy to understand. A female participant described the strength of such a creative strategy:

> These two are part of the same group. What I like about both of them is that the text is with the visual. Whereas with this, the text is away from it and I focus more towards the picture and I don't spend the time to read it. With [the PSAs with text alongside the visual] – you are forced to read it.

Adolescents wanted obesity prevention PSAs to have a focal point and they found PSAs with many visuals and a great deal of text to be overwhelming and confusing. When encountering these types of ads, adolescents focused on the visual and disregarded the text. One female participant commented on how she processed PSAs with too many visuals and text:

> I don't know where to look at first when I look at that. There is no real focus point of the entire ad. There are too many words and there is not enough emphasis on the important ones I guess.

Background

Adolescents described obesity prevention PSAs with white backgrounds as professional looking and attention-grabbing. They mentioned: "the ad jumps out at you with the white background" and "white space makes you look at the actual visual". Participants did not like too brightly coloured or busy-looking backgrounds because it took away from the image(s) within the PSA. Adolescents also disliked unprofessional looking ads. One male participant described an unprofessional looking PSA: "it looks like you didn't spend much time making it…like clip art".

Unbelievable Obesity Prevention PSAs

For adolescents to believe the information conveyed in PSAs these must contain up-to-date and relevant information. Participants noticed any PSA which contained outdated equipment. For instance, both male and female participants mentioned: "the shoe is not stylish" and "the bike is outdated". They easily noticed activities that were irrelevant to them: "for me personally, I like things that are relevant to my times". Adolescents spoke enthusiastically about relevant activities; such as, exercising in gyms, playing competitive sports (e.g., soccer, basketball, hockey, and football), participating in trendy sports (e.g., break dancing), and doing extreme sports (e.g., snowboarding, skiing, wake boarding, and running).

Participants did not like PSAs that depicted unrealistic situations for the everyday adolescent. One female participant described a PSA depicting reporters watching adolescents play volleyball:

> With the press coming…it's so fake! Plus that one is for younger looking kids. We don't have time to play in our backyards. Yeah, the backpacks are all pink, I wanted that in grade one but not when I'm 17.

Likewise, a male participant described an unrealistic PSA depicting body fat that had fallen off people who participated in healthy eating and physical activity:

> Well no, why would you be looking for [love handles]? If you lost them, how were you able to get a picture of them after they have falling off your body? If this is in the sidewalk, why would you take a picture of them and walk away? Then three weeks later put up a poster?

Adolescents recalled healthy eating campaigns that were not part of the PSAs they reviewed in the focus groups; such as, the Ontario-based Not Gonna Kill You campaign (Government of Ontario, 2006) which they described as unrealistic because it depicted eating healthy snacks as fearful. One female participant commented: "the ones where they have a whole bunch of apples and she is screaming…I think those are silly. It's just apples – no one does that. It's exaggerated." Similarly, focus group participants did not like ads that made physical activity or healthy eating look painful. When shown such PSAs, one male participant commented: "makes you want to slit your wrists or something".

Proposed Groupings

Participants understood and agreed with the proposed obesity prevention PSA groupings. They were also able to easily identify which PSAs did not speak to them.

Body-Image Focused

Participants gave mixed reactions towards the body-image focused PSAs and clear gender differences existed in opinions in this category. Females favoured overweight body-images and felt they were unique in comparison to the traditional skinny models normally seen in ads. A female participant spoke positively about such PSAs: "that one is so effective because it's such a 180 from the skinny models you see plastered on walls. You would walk by it and stop, come back". On the other hand, females were offended when they saw an obese individual in a PSA, particularly when the individuals face was shown, as they found it degrading. They also mentioned that such PSAs only spoke to obese individuals. When asked if they were offended by images of overweight (but not obese) people, one female commented: "none of us are that conservative to be offended".

Male participants did not take the body-image ads seriously, mentioning: "it looks like an ad for liposuction" and "I think the shock value is actually comical. Cheesy". Males favoured the obesity prevention PSA featuring an obese woman and found the PSA to be unique, mentioning: "very rarely do they put a person who is obese on the poster. That right away stuck out. It's not something you see very often". Understandably, compared to body-images of females, males favoured body-images of males and easily identified with them. One male participant described not identifying with female weight gain:

> I think the ones with the guys are more effective. The hips aren't because guys don't fill out in the hips. As a guy, this is just another woman's body. Neither one of the girls look obese to me. They just don't look like they are Britney Spears.

Health Focused

Both males and females liked PSAs that included brief, easy to digest statistics about Canadian obesity. They found this information relevant and by being shown statistics, they felt adolescents were expected to be the decision-makers for their physical activity and healthy eating-related choices. Such comments included:

> We hear it all the time: you should do this, do that. As a youth we are told things all the time. So with the information, stats, it gives us the information on its own and we can make the decision.

Participants discerned between messages about physical inactivity and poor nutrition that referred to immediate versus long term health effects. Adolescents preferred the former and males and females did not favour those PSAs discussing long term health effects. As one female participant commented: "I would like to see more where they tell us the immediate effects of not being healthy – high blood pressure, etc". Likewise, a male participant mentioned: "I think the cancer thing, for teens, I don't think about cancer. I would be more scared of being killed in a car accident than cancer". For adolescents, the long term effects of physical inactivity and poor nutrition (e.g., cancer) were confusing because they felt that a variety of other non-related aspects were also responsible for long term health consequences.

Non-Health Focused

Adolescents were pleased with the non-health focused PSA category and felt the ads portrayed the fun aspects of physical activity and healthy eating. They mentioned the PSAs asked adolescents to figure out for themselves the fun, or immediately rewarding aspects of healthy eating or participating in physical activity. The concept of trying new things was particularly appealing to all participants: "there are all kinds of different activities going on in them and I think that's really neat. That shows you that you can be involved with everything, unlimited options".

When shown the non-health focused category, female participants were reminded of other ad campaigns they liked. Examples included the Tri-Cyclen Lo television campaign (Grip Limited, 2007), which depicted various activities adolescents could try as well as the Lexus Pursuit of Perfection television campaign (Marketing Magazine, 2006) which depicted monumental moments in history and every day life. Interestingly, the Tri-Cyclen Lo campaign was so effective among female participants that they did not realize the campaign advertised a birth control pill. Instead, they though the advertisement was for a medicine that reduced menstruation. When asked if the campaign was for a birth control pill, a female participant responded: "no, it's so you only have your period three times a year or something like that". One female participant described the strengths of both ads:

> It's like the Lexus, Pursuit of Perfection commercial. Moments of Joy, moments of passion, moments of sorrow, moments that define you. The Tri-Cyclen Lo is like that too – try this, try that, and they show images that are not all the same images, they are images in different places. Moments that can define you – in that commercial, it was people tearing down the Berlin wall. Those ads really get to you. That's like the Tri-Cyclen Lo.

See Appendix U for the PSAs included in the main study and sample comments.

Focus Group Conclusions

Focus groups results were useful in helping to narrow down each obesity prevention PSA category to appeal to adolescents as per the suggestions offered. For body-image PSAs, priority was given to the female participant comments, as they were more likely to find such PSAs appealing. For health focused PSAs, advertisements were chosen that demonstrated both short and long term health information to allow for further analysis in the main experiment. Last, all participants were in general agreement with the non-health focused category and PSA elimination was straightforward for this group. Consideration was also given to the original PSA category requirements (e.g., balance of males and females by category, balance of healthy eating and physical activity related promotion by category, etc).

Focus group outcomes led to several conclusions in relation to the second study objective (explore general reactions to the PSAs in adolescent focus groups and validate the groupings) as well as the fourth study objective (aspects of the design of the PSAs that might inform more effective materials for new social marketing approaches for the prevention or reduction of adolescent obesity):

1. PSAs geared towards adolescents should be well-designed and professional looking;
2. Adolescent-geared obesity prevention PSAs need not include both physical activity and healthy eating-related messages, as they are naturally associated with one another. If they are included in the same PSA, the creative style should be simplistic;
3. Where appropriate, the use of humor can be very appealing in obesity prevention PSAs. For instance, obesity prevention PSAs that depict out of the ordinary objects alongside the desired behaviour may be effective;
4. It is important to exhibit cultural diversity in obesity prevention PSAs when marketing to adolescents in Canada;
5. Aesthetic characteristics of physical activity and healthy eating-related PSAs that adolescents find appealing include: simple, realistic, colourful visuals; minimal text alongside the visual; white backgrounds; and little to no cartoons;
6. If adolescents are shown equipment or behaviours in obesity prevention PSAs, both need to be up-to-date and stylish;
7. Body-image PSAs featuring overweight images are more appealing to female adolescents, but images depicting obese individuals are not appealing. Male adolescents are unreceptive to body-image PSAs, but if shown such ads they are more likely to identify with male body-images;
8. If ads discuss health effects, long term health consequences of the undesired behaviour or long term health benefits of the desired behaviour should be avoided. Instead, adolescents find current statistics, short term health consequences and short term health benefits to be preferable; and,
9. Behaviours depicted should be realistic for adolescents and portray the fun aspects of healthy eating and physical activity.

Hypothesis Testing: Phase IV Main Experiment Results

Randomization

Baseline variable values were examined visually by group to assess the adequacy of randomization (no specific statistical testing occurred). Results are shown in Tables 9-12.

Table 9.

Randomization: Continuous Demographic Variables

Baseline variables	Overall[a]		Body-Image[b]		Health[c]		Non-Health[d]		Control[e]	
	M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Age (*years*)	15.00	(1.00)	16.00	(1.00)	15.00	(1.00)	15.00	(1.00)	16.00	(2.00)
Neighborhood persons in low income homes (%)	10.77	(8.19)	12.66	(10.33)	10.05	(7.58)	10.27	(7.02)	10.49	(8.32)
School grade	10.00	(1.00)	10.00	(1.00)	10.00	(1.00)	10.00	(1.00)	10.00	(1.00)
Weekly screen time (*hours*)	17.01	(10.28)	15.43	(8.48)	15.72	(8.67)	18.14	(11.95)	18.57	(11.55)
Daily fruit & vegetable consumption	3.42	(2.55)	2.81	(1.44)	3.16	(1.68)	3.83	(3.62)	3.78	(2.65)
Weekly physical activity (*hours*)	12.60	(6.15)	11.86	(5.10)	12.52	(6.21)	13.12	(7.11)	12.76	(6.15)

Note. Respondent data (*n* =10) was dropped from analysis for the variable: neighborhood persons in low income homes.

[a] *N*=95. [b] *n*=21. [c] *n*=25. [d] *n*=26. [e] *n*=23.

Table 10.

Randomization: Categorical Demographic Variables

Baseline variables	Overall[a]	Body-Image[b]	Health[c]	Non-Health[d]	Control[e]
	%	%	%	%	%
Males	47	62	32	50	48
Females	53	38	68	50	52
English language	96	86	96	100	100
Other language	4	14	4	0	0
Birth city: Calgary	62	43	60	69	74
Birth city: Other	38	57	40	31	26
Excellent self-perceived health	23	14	20	27	30
Very good self-perceived health	45	48	36	54	44
Good self-perceived health	25	33	28	19	22
Fair self-perceived health	6	5	16	0	4
White	72	57	68	81	78
South asian	12	19	16	8	4
Black	4	10	8	0	0
Southeast asian	4	5	0	4	9
Arab	1	0	0	0	4
Korean	1	5	0	0	0
Aboriginal	1	0	0	4	0
Other	2	0	4	0	4
Multi	3	5	4	4	0

[a] *N*=95. [b] *n*=21. [c] *n*=25. [d] *n*=26. [e] *n*=23.

Table 11.

Randomization: Continuous Dependent Variables

Baseline variables	Overall[a] *M*	Overall[a] *(SD)*	Body-Image[b] *M*	Body-Image[b] *(SD)*	Health[c] *M*	Health[c] *(SD)*	Non-Health[d] *M*	Non-Health[d] *(SD)*	Control[e] *M*	Control[e] *(SD)*
Pre overall state self-esteem	74.69	(14.14)	76.65	(13.48)	75.76	(11.67)	71.77	(19.27)	75.13	(10.11)
Pre performance self-esteem	27.65	(4.64)	27.70	(5.21)	28.20	(3.86)	27.24	(5.29)	27.44	(4.37)
Pre social self-esteem	26.19	(5.34)	26.35	(6.43)	26.08	(5.84)	26.20	(5.00)	26.17	(4.56)
Pre appearance self-esteem	21.66	(4.43)	22.60	(4.41)	21.48	(5.10)	21.20	(4.14)	21.52	(4.13)
Pre overall mood	28.79	(13.96)	28.57	(13.40)	27.56	(15.84)	29.50	(14.29)	29.52	(12.68)
Pre anxiety	6.88	(3.64)	6.76	(3.74)	6.72	(4.48)	6.85	(3.12)	7.22	(3.30)
Pre depression	12.23	(6.99)	11.95	(6.67)	11.84	(7.76)	12.73	(7.13)	12.35	(6.66)
Pre hostility	9.67	(4.58)	9.86	(4.02)	9.00	(4.99)	9.92	(4.94)	9.96	(4.38)
Pre overall healthy eating intention	4.47	(1.21)	4.29	(1.26)	4.50	(1.32)	4.60	(1.07)	4.45	(1.27)
Pre healthy eating intention	4.64	(1.30)	4.41	(1.45)	4.60	(1.40)	4.73	(1.13)	4.80	(1.27)
Pre healthy eating expect	4.27	(1.28)	4.14	(1.21)	4.36	(1.43)	4.44	(1.17)	4.09	(1.36)
Pre overall physical activity intention	5.24	(.98)	5.26	(1.00)	5.12	(1.24)	5.34	(.86)	5.19	(.80)
Pre physical activity planning	5.35	(.94)	5.26	(1.04)	5.30	(1.22)	5.48	(.66)	5.33	(.82)
Pre physical activity expectation	5.11	(1.14)	5.24	(1.04)	5.02	(1.37)	5.17	(1.17)	5.02	(.98)

Note . Respondent data was dropped from analysis for the variable pre overall state self-esteem (*n* =2).

[a] *N*=95. [b] *n* =21. [c] *n* =25. [d] *n* =26. [e] *n* =23.

Table 12.

Randomization: Categorical Dependent Variables

Baseline variables	Overall[a] %	Body-Image[b] %	Health[c] %	Non-Health[d] %	Control[e] %
Pre healthy eating stages of change					
Precontemplation	7	5	12	0	9
Contemplation	14	14	20	8	13
Preparation	13	14	8	15	13
Action	35	29	48	35	26
Maintenance	33	38	12	42	39
Pre physical activity stages of change					
Precontemplation	1	0	0	4	0
Contemplation	5	0	8	8	4
Preparation	10	14	12	12	0
Action	20	33	12	8	26
Maintenance	65	52	68	69	70

[a] *N*=95. [b] *n* =21. [c] *n* =25. [d] *n* =26. [e] *n* =23.

For demographic variables, weekly screen time (continuous variable) as well as gender and self-perceived health (categorical variables) were not optimally balanced across groups. For continuous dependent variables, all variables seemed to be relatively uniformly distributed. Some imbalances were seen for the stages of change variables at baseline (categorical dependent variables). Such imbalances are likely a result of imperfect randomization in relatively small samples.

Hypothesis I: Unintended Effects

Initial inspections of the distributions as well as bivariate analysis were used to examine the hypothesis that obesity prevention body-image PSAs would be significantly more likely to induce negative weight attitudes, lower self-esteem and produce negative mood in comparison to the control condition.

Post-Only Weight Attitude by Testing Condition

In initial inspection of the distributions of weight attitude by group, weight attitude scores from the body-image condition appeared to be less negative in comparison to all other conditions. Using a one way between-subjects ANOVA examining mean differences between all testing conditions (independent categorical variable) and post-only measures of weight attitude, including the subscales (dislike, fear or fat, and willpower) no significant differences were found by group overall or in the subscales. However, the fear of fat subscale was close to significance with more negative weight attitudes being present in the health condition (Table 13 and Figure 3). Contrary to the hypothesis, obesity prevention body-image PSAs were not significantly more likely to induce negative weight attitudes in comparison to control PSAs in adolescents.

Table 13.

Testing Condition and Unintended Effects: Weight Attitude

Variable	Test statistic and significance level[+]	Body-Image[a]		Health[b]		Non-Health[c]		Control[d]	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Post overall weight attitude	$F = 1.47$; .23	3.19	(1.66)	3.93	(1.27)	3.89	(1.48)	3.90	(1.09)
Post dislike	$F = 1.01$; .39	2.32	(1.66)	2.40	(1.52)	3.04	(1.95)	2.47	(1.27)
Post fear of fat	$F = 2.56$; .06[*]	3.29	(3.30)	5.72	(3.19)	4.24	(3.00)	5.17	(3.26)
Post willpower	$F = .86$; .47	5.09	(2.31)	5.78	(2.08)	5.51	(2.01)	6.07	(2.16)

Note. Higher mean values indicate more negative weight attitudes. Scores range from 0-9 for overall and all subscales. No pre measures existed for weight attitude.

[a] $n=21$. [b] $n=25$. [c] $n=26$. [d] $n=23$.

[*] Post fear of fat is very close to significance. [+] using Analysis of Variance.

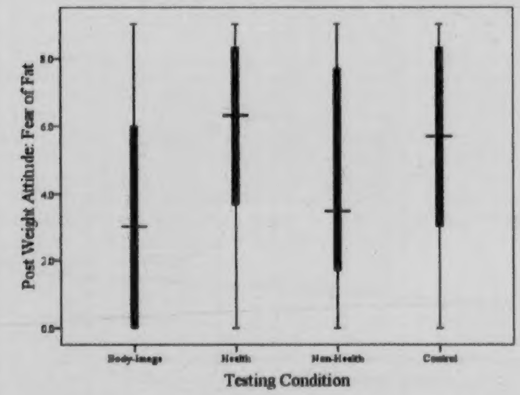


Figure 3. Box plot for weight attitude: fear of fat subscale.

State Self-Esteem by Testing Condition

In initial inspection of the distributions of pre and post state-self esteem by group, self-esteem appeared to be high across conditions. The body-image PSA group had high self-esteem at pre and post administration. Moreover, the highest post overall self-esteem scores were found in the body-image condition in comparison to all other conditions. Using a one way between-subjects ANOVA examining mean differences between all testing conditions (independent categorical variable) and post measures of state self-esteem (outcome variable), including subscales (performance, social, and appearance self-esteem) no significant differences were found overall or in the related subscales (Table 14).

The differences between pre and post self-esteem scores were used to create a new variable, *self-esteem change*. Using a one way between-subjects ANOVA examining mean differences between all testing conditions and self-esteem change (including subscales) no significant differences were found overall or in the subscales (Table 14). Contrary to the hypothesis, obesity prevention body-image PSAs were not more likely to produce immediate self-esteem changes in comparison to control PSAs in adolescents.

Table 14.

Testing Condition and Unintended Effects: Self Esteem

Variable	Test statistic and significance level^{+}	Body-Image^{a}		Health^{a}		Non-Health^{a}		Control^{a}	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Post overall state self-esteem	F = .18 ; .912	77.24	(13.56)	75.32	(15.38)	74.50	(13.45)	76.26	(11.46)
Post performance self-esteem	F = .43 ; .733	27.81	(5.34)	28.64	(4.53)	27.04	(5.26)	27.74	(5.06)
Post social self-esteem	F = .13 ; .939	26.24	(6.39)	25.64	(6.73)	26.00	(5.30)	26.70	(5.08)
Post appearance self-esteem	F = .79 ; .502	23.19	(4.75)	21.04	(6.05)	21.46	(4.57)	21.83	(4.10)
Self-esteem change	F = .34 ; .800	0.05	(5.17)	-0.44	(6.26)	0.48	(5.68)	1.13	(5.10)
Performance self-esteem change	F = .28 ; .837	-0.25	(2.77)	0.44	(2.74)	0.08	(2.48)	0.30	(2.62)
Social self-esteem change	F = .52 ; .672	0.00	(2.87)	-0.44	(2.45)	0.12	(2.76)	0.52	(2.74)
Appearance self-esteem change	F = .73 ; .541	0.30	(1.26)	-0.44	(2.65)	0.28	(2.42)	0.30	(1.72)

Note. Higher mean values indicate higher self-esteem. Scores range from 20-100 for overall, 7-35 for the performance subscale, 7-35 for the social subscale, and 6-30 for the appearance subscale.

^{a}n=20. ^{b}n=25. ^{c}n=25. ^{d}n=23.

$^{+}$ using Analysis of Variance.

Mood by Testing Condition

In initial inspection of the distributions of mood by group, more negative overall moods appeared to exist in the post body-image and non-health conditions in comparison to the health and control conditions. Using a one way between-subjects ANOVA examining mean differences across testing conditions (independent categorical variable) and post measures of mood (outcome variable), including subscales (anxiety, depression, and hostility) no significant differences were found overall or in the related subscales.

The differences between pre and post mood scores were used to create a new variable: *mood change*. Using a one way between-subjects ANOVA examining mean differences between all testing conditions and mood change (including subscales) no significant main effects were found overall or in the related subscales. However, the anxiety subscale difference was very close to significance. Planned comparisons using Tukey's honestly significant difference (HSD) post-hoc comparison revealed a significant pairwise mood change difference existed for mean anxiety wherein participants exposed to obesity prevention body-image PSAs were more likely to show an increase in anxiety between pre and post administration in comparison to those exposed to control PSAs. The effect size (using Cohen's *d*) for the body-image and control anxiety pairwise difference was large at .79 (Cohen, 1988).

Aligned with the hypothesis, obesity prevention body-image PSAs were significantly more likely to stimulate anxiety in comparison to control PSAs. Table 15 shows test statistics and Figure 4 contains the anxiety change box plot.

Table 15.

Testing Condition and Unintended Effects: Mood

Variable	Test statistic and significance level[+]	Body-Image[a]		Health[b]		Non-Health[c]		Control[d]	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Post overall mood	$F = .12 ; .95$	28.57	(13.40)	27.56	(15.84)	29.50	(14.29)	29.52	(12.68)
Post anxiety	$F = .35 ; .79$	6.76	(3.74)	6.72	(4.48)	6.85	(3.12)	7.22	(3.30)
Post depression	$F = .21 ; .89$	11.95	(6.67)	11.84	(7.76)	12.73	(7.13)	12.35	(6.66)
Post hostility	$F = .10 ; .96$	9.86	(4.02)	9.00	(4.99)	9.92	(4.94)	9.96	(4.38)
Mood change	$F = .99 ; .40$	2.52	(6.41)	1.4	(4.97)	1.08	(5.93)	-0.48	(6.15)
Anxiety change	$F = 2.56 ; .06$*	0.95_{a}	(2.20)	0.16_{ab}	(2.23)	0.15_{ab}	(1.78)	-0.74_{b}	(1.89)
Depression change	$F = .31 ; .82$	0.90	(3.14)	0.80	(2.33)	0.88	(3.73)	0.22	(3.59)
Hostility change	$F = .23 ; .87$	0.67	(2.94)	0.44	(2.57)	0.04	(2.49)	0.04	(2.67)

Note . Higher mean values indicate more negative mood. Scores range from 0-91 for overall, 0-21 for the anxiety subscale, 0-40 for the depression subscale, and 0-30 for the hostility subscale. Means in the same row that do not share subscripts ($_{a}$ or $_{b}$) differ at $p < .05$ in the Tukey honestly significant difference comparison.

[a] n=21. [b] n=25. [c] n=26. [d] n=23.

* Anxiety change is very close to significance at in the predicted direction. [+] using Analysis of Variance.

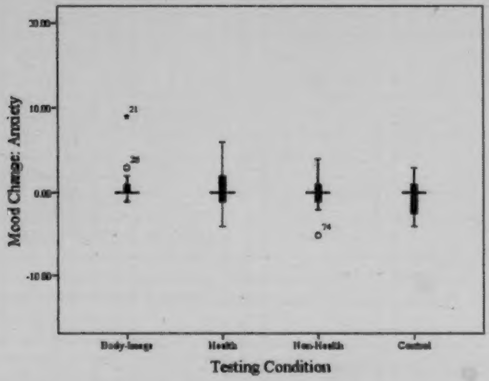


Figure 4. Box plot for mood change: anxiety subscale.

Hypothesis I Conclusions: Unintended Effects by Study Group

No main effects were found for unintended effects. Planned comparisons revealed that obesity prevention body-image PSAs seemed to increase anxiety between pre and post administration, while control PSAs seemed to decrease anxiety among adolescents in this sample. Table 16 shows the hypothesis testing results for unintended effects.

Table 16.

Hypothesis Testing for Unintended Effects

Hypothesis	Significant findings	Supported or did not support hypothesis
Body-image focused PSAs would be significantly more likely to induce negative weight attitudes in comparison to the control condition.	None.	Did not support.
Body-image focused PSAs would be significantly more likely to lower self-esteem in comparison to the control condition.	None.	Did not support.
Body-image focused PSAs would be significantly more likely to stimulate negative mood in comparison to the control condition.	Exposure to body-image PSAs showed an increase in anxiety between pre and post scores, while exposure to control PSAs showed a decrease (using Tukey comparisons, no main effect was found). No changes were found in the health and non-health conditions.	Supported. However, further testing with a larger sample size may be required.

Hypothesis II: Ad Evaluation and Change Intentions

Initial inspections of the distributions as well as bivariate analysis was used to examine the prediction that obesity prevention non-health focused PSAs (independent variable) would receive more positive ad evaluations and change intentions (dependent variables) in comparison with obesity prevention health focused PSAs.

Ad Evaluation by Testing Condition

In initial inspection of the distributions of ad evaluation by group, the lowest evaluations appeared to be in the control PSAs, while the highest evaluations were for health PSAs. Body-image and non-health obesity prevention PSAs received similar scores. Using a one way between-subjects ANOVA examining mean differences between all testing conditions (independent categorical variable) and ad evaluation (outcome variable), including subscales (attitude, believability, and readability), a significant main effect for overall ad evaluation and associated subscales was found for adolescents.

Tukey's HSD post-hoc comparison revealed significant overall ad evaluation pairwise differences: control PSAs received lower evaluations in comparison to all other conditions. Large effect sizes were found when control ad evaluations were calculated with each group score: 1.66 for health, 1.03 for non-health, and .95 for body-image (Cohen, 1988). Tukey's HSD post-hoc comparison showed significant subscale pairwise differences. Control PSAs received lower attitude and believability ratings than other conditions among adolescents. Pairwise effect sizes were large for control attitude ratings when calculated with scores from other conditions: 1.44 for non-health, 1.18 for health, and 1.13 for body-image. Large effect sizes were also found when control believability ratings were calculated with scores from other conditions: 1.63 for health, .99 for body-image, and .81 for non-health. Health PSAs also received higher readability ratings among adolescents than body-image, and non-health PSAs. Large effect sizes of .98 for body-image and .85 for non-health readability scores were calculated (Cohen, 1988).

Contrary to predictions, obesity prevention non-health focused PSAs did not receive more positive ad evaluations in comparison with health focused PSAs. Table 17 reveals test statistics, while Figure 5 depicts the box plots for ad evaluation and related subscales.

Table 17.

Testing Condition and Ad Evaluation

Variable	Test statistic and significance level[+]	Body-Image[a]		Health[b]		Non-Health[c]		Control[d]	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Overall ad evaluation	*F* = 8.62 ; .00**	190.15_a	(34.77)	203.83_a	(23.84)	192.83_a	(34.73)	159.74_b	(29.09)
Attitude	*F* = 10.16 ; .00**	69.20_a	(13.75)	69.57_a	(13.31)	74.71_a	(15.36)	52.52_b	(15.61)
Believability	*F* = 8.12 ; .00**	78.75_a	(19.95)	85.17_a	(14.65)	74.67_a	(18.03)	61.39_b	(14.59)
Readability	*F* = 4.59 ; .01**	42.20_a	(7.66)	49.09_b	(6.37)	43.46_a	(6.82)	45.83_{ab}	(5.76)

Note . Higher mean values indicate greater likeability. Scores range from 40-280 for overall, 16-112 for the attitude subscale, 16-112 for the believability subscale, and 8-56 for the readability subscale. Means in the same row that do not share subscripts ($_a$ or $_b$) differ at $p < .05$ in the Tukey honestly significant difference comparison.

[a] n =20. [b] n =23. [c] n =24. [d] n =23.

**$p < .05$. [+] using Analysis of Variance.

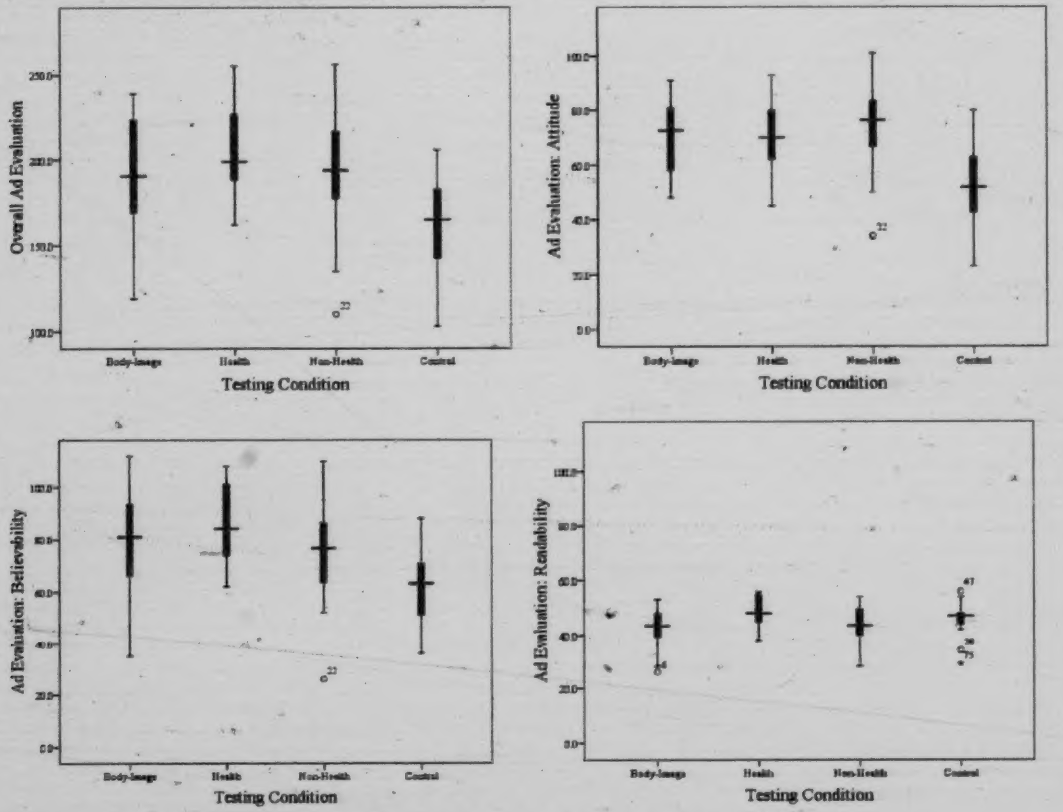


Figure 5. Box plots for overall ad evaluation and subscales.

Behaviour Intention by Testing Condition

In initial inspection of the distributions of behaviour intention by group, high pre and post overall behaviour intentions (particularly for physical activity) existed as well as outliers depicting low scores. Slight increases in overall healthy eating intention were found in all experimental conditions. Likewise, slight increases in overall physical activity intention were found for the pre and post health conditions, but not other experimental conditions. Control condition change scores remained stable for both behaviours. Histograms revealed that most distributions were quite negatively skewed (Figure 6).

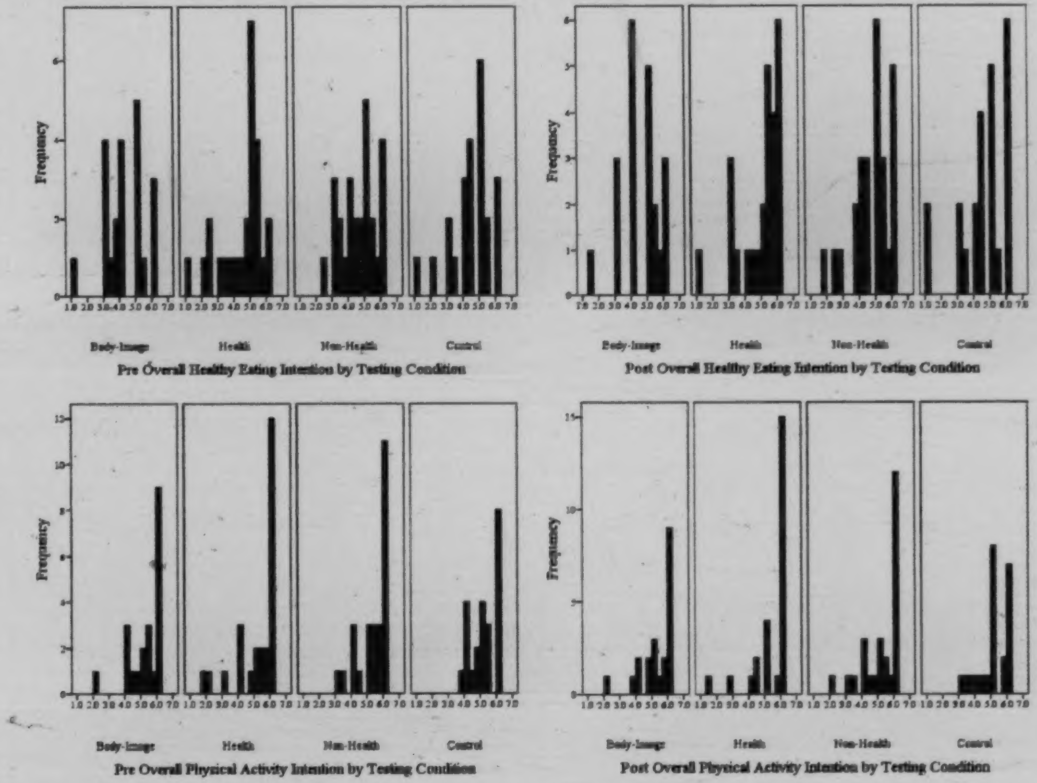


Figure 6. Pre and post histograms for overall behaviour intention.

Transformations were applied to all pre and post healthy eating and physical activity behaviour intention distributions (including subscales) to improve normality (Lane, 2006). A comparison of bivariate analysis run on original and transformed scores revealed consistent findings regardless of transformations. All change intention data reported hereon is based on original scores; however, should be interpreted with caution because of potential lack of normality.

Using a one way between-subjects ANOVA examining mean differences across testing conditions (independent categorical variable) and post measures of physical activity/healthy eating behaviour intention (outcome variables), including subscales (planning and expectation) no significant differences were found among adolescents.

Pre and post change scores for behaviour intentions were collapsed into new variables: *healthy eating change* and *physical activity change.* A one way between-subjects ANOVA examining mean differences between all testing conditions and behaviour change (including subscales) revealed a significant main effect existed in the subscale healthy eating planning change. Tukey's HSD post-hoc comparison demonstrated significant pairwise differences between health and control conditions, where health PSAs were more likely to result in healthy eating planning between pre and post administration. A large effect size (using Cohen's *d*) of .93 was calculated for healthy eating planning between health and control conditions (Cohen, 1988).

Contrary to predictions, obesity prevention non-health focused PSAs did not receive more change intentions in comparison to health focused PSAs. Test statistics are shown in Table 18, while Figure 7 depicts the box plot for the healthy eating planning change subscale.

Table 18.

Testing Condition and Behaviour Intention

Variable	Test statistic and significance level$^+$	Body-Image^a		Health^b		Non-Health^c		Control^d	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Post overall healthy eating intention	F = .51 ; .68	4.55	(1.21)	4.95	(1.29)	4.75	(1.12)	4.57	(1.44)
Post healthy eating planning	F = 1.14 ; .34	4.50	(1.29)	5.20	(1.23)	4.89	(1.18)	4.85	(1.42)
Post healthy eating expectation	F = .37 ; .78	4.57	(1.20)	4.68	(1.45)	4.58	(1.21)	4.28	(1.59)
Post overall physical activity intention	F = .20 ; .90	5.24	(1.03)	5.36	(1.13)	5.19	(1.08)	5.15	(.83)
Post physical activity planning	F = .49 ; .69	5.17	(1.11)	5.50	(1.02)	5.25	(1.10)	5.26	(.74)
Post physical activity expectation	F = .26 ; .86	5.29	(1.07)	5.20	(1.29)	5.10	(1.17)	5.00	(1.10)
Overall healthy eating change	F = 1.85 ; .14	0.26$_a$	(.48)	0.46$_a$	(.56)	0.15$_{ab}$	(.71)	0.12$_a$	(.40)
Healthy eating planning change	F = 3.19 ; .03**	0.10$_{ab}$	(.34)	0.60$_a$	(.80)	0.15$_{ab}$	(1.01)	0.04$_b$	(.30)
Healthy eating expectation change	F = .86 ; .47	0.43	(.78)	0.32	(.76)	0.13	(.56)	0.20	(.62)
Overall physical activity change	F = 1.91 ; .13	-0.02	(.44)	0.18	(.49)	-0.15	(.60)	-0.04	(.49)
Physical activity planning change	F = 1.89 ; .14	-0.10	(.58)	0.20	(.68)	-0.23	(.70)	-0.07	(.66)
Physical activity expectation change	F = .97 ; .41	0.05	(.55)	0.18	(.43)	-0.08	(.63)	-0.02	(.63)

Note. Higher mean values indicate greater behaviour intention. Scores range from 1-6 for overall healthy eating or physical activity intention and all subscales. Means in the same row that do not share subscripts ($_a$ or $_b$) differ at $p < .05$ in the Tukey honestly significant difference comparison.

^{a}n=21. ^{b}n=25. ^{c}n=26. ^{d}n=23.

**$p < .05$. $^+$using Analysis of Variance.

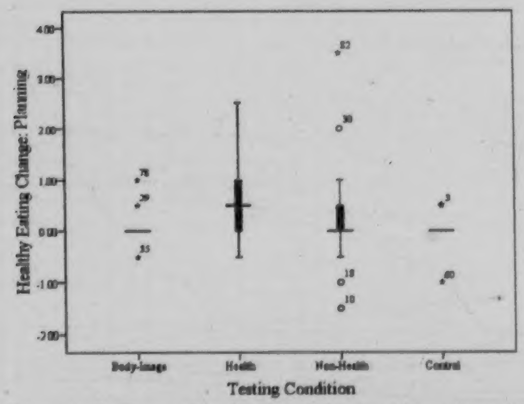


Figure 7. Box plot for healthy eating planning change subscale.

Stages of Change by Testing Condition

When pre and post frequencies for healthy eating and physical activity stages of change were observed, the vast majority of participant scores fell in the action or maintenance stages. As well, slight increases were found in the action or maintenance stage between pre and post administration for all experimental conditions. Chi-Square tests of independence examining the relationship between stages of change (yes/no) across groups for shifts in physical activity and healthy eating found no significant differences for healthy eating or physical activity shifts regardless of positive or negative shifts. Contrary to predictions, non-health focused PSAs did not produce a shift in stages of change in comparison with health focused PSAs. Table 19 displays the test statistics.

Table 19.

Testing Condition and Stages of Change

Variable	Test statistic and significance level*	Body-Image[a]		Health[b]		Non-Health[c]		Control[d]	
		Shift *(n)*	No Shift *(n)*	Shift *(n)*	No Shift *(n)*	Shift *(n)*	No Shift *(n)*	Shift *(n)*	No Shift *(n)*
Stages of change shifts									
Healthy eating	$x^2 = 1.55$; .67	4	17	3	22	5	21	2	21
Physical activity	$x^2 = 2.68$; .44	1	20	5	20	5	21	3	20

[a] *n*=21. [b] *n*=25. [c] *n*=26. [d] *n*=23.
*using Chi-Square.

Hypothesis II Conclusions: Ad Evaluation and Change Intentions by Study Group

The hypothesis that non-health PSAs would receive more positive ad evaluations and change intentions in comparison to health PSAs was not supported (Table 20). Instead, healths PSAs received significantly higher readability scores than other experimental conditions and were more likely to result in change intentions (healthy eating planning) in comparison to control PSAs.

Table 20.

Hypothesis Testing for Ad Evaluation and Change Intentions

Hypothesis	Significant findings	Supported or did not support hypothesis
Non-health focused PSAs would receive more positive ad evaluations in comparison with health focused PSAs.	Control PSAs received significantly lower overall ad evaluations, attitude, and believability ratings in comparison to all other PSA groups. Health PSAs received significantly higher readability than body-image and non-health PSAs.	Did not support.
Non-health focused PSAs would result in more change intentions in comparison with health focused PSAs.	When behaviour change pre and post scores were collapsed, healthy eating PSAs were significantly more likely than control PSAs to result in healthy eating planning (subscale).	Did not support.

Phase IV Main Experiment Results: Summary

The main experiment allowed conclusions to be made about the third study objective (determine the immediate effects of exposure to PSAs in adolescents grouped according to body-image, health focus, non-health focus and control messages) and the fourth study objective (aspects of the design of the PSAs that might inform more effective materials for new social marketing approaches for the prevention or reduction of adolescent obesity), these include:

1. Exposure to body-image PSAs stimulated anxiety among adolescents in this study (as predicted) using Tukey comparisons, but no main effect was found. No significant differences were found for negative weight attitudes (fear of fat was close to significance but Tukey comparisons did not reach significance) or self-esteem (contrary to predictions);
2. Adolescents in this study found obesity prevention ads more appealing than control ads depicting hand washing, sun safety, seat belt use, and volunteerism;
3. Participants found health PSAs to be more readable (e.g., easy to read and understand) than body-image and non-health PSAs (contrary to predictions); and,
4. Exposure to obesity prevention health PSAs seemed to cause increases in plans to eat healthy among adolescents in the main experiment (contrary to predictions).

Exploratory Gender Analysis

Exploratory research, without a hypothesis of the intended results, examined continuous outcome variables to determine if there was a gender effect.

Gender: Unintended Effects

Gender Post-Only Weight Attitude by Testing Condition

Using a one way between-subjects ANOVA examining differences between all testing conditions and post-only measures of weight attitude, including subscales (dislike, fear or fat, and willpower) for males and females respectively, a significant main effect was found among males for the willpower subscale. Tukey's HSD post-hoc comparison showed significant pairwise differences: males exposed to obesity prevention body-image

PSAs had less negative willpower scores than those shown control PSAs (negative willpower indicated attitudes that people were overweight because they have no willpower, lack exercise habits, etc). The effect size between the body-image and control willpower scores for males was large at 1.27 (Cohen, 1988). Table 21 contains the test statistics, while Figure 8 shows the male box plot for the willpower subscale.

Table 21.

Testing Condition and Unintended Effects: Gender Weight Attitude

Variable	Test statistic and significance level$^+$	Body-Image^a		Health^b		Non-Health^c		Control^d	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Males									
Post overall weight attitude	$F = 1.63 ; .20$	2.79	(1.49)	3.39	(1.56)	3.75	(.98)	3.77	(1.12)
Post dislike	$F = .90 ; .45$	2.48	(1.66)	2.05	(1.75)	3.16	(1.51)	2.76	(1.46)
Post fear of fat	$F = 1.47 ; .24$	1.62	(1.76)	3.95	(3.71)	3.06	(2.26)	3.00	(2.89)
Post willpower	$F = 3.11 ; .04^{**}$	4.64_a	(2.33)	6.00_{ab}	(2.21)	5.72_{ab}	(1.82)	7.09_b	(1.44)
Females									
Post overall weight attitude	$F = .10 ; .16$	3.85	(1.80)	4.19	(1.06)	4.03	(1.89)	4.03	(1.10)
Post dislike	$F = .57 ; .64$	2.06	(1.74)	2.57	(1.42)	2.92	(2.37)	2.21	(1.07)
Post fear of fat	$F = .84 ; .48$	6.00	(3.51)	6.55	(2.64)	5.42	(3.26)	7.16	(2.16)
Post willpower	$F = .23 ; .87$	5.81	(2.23)	5.68	(2.07)	5.30	(2.24)	5.14	(2.34)

Note. Higher mean values indicate more negative weight attitudes. Scores range from 0 -9 for overall and all subscales. Means in the same row that do not share subscripts ($_a$ or $_b$) differ at $p < .05$ in the Tukey honestly significant difference comparison. Advise caution when interpreting these results due to small sample sizes.

^{a} males $n = 13$, females $n = 8$. ^{b} males $n = 8$, females $n = 17$. ^{c} males $n = 13$, females $n = 13$. ^{d} males $n = 11$, females $n = 12$.

$^{**}p < .05$. $^+$ using Analysis of Variance.

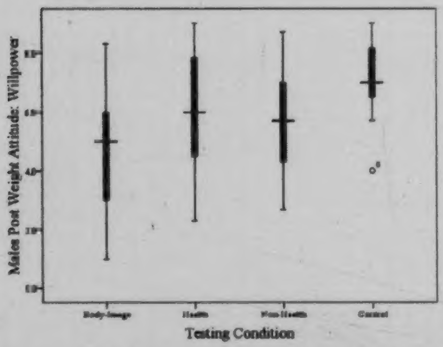


Figure 8. Box plots for weight attitude in males: willpower subscale.

Gender State Self-Esteem by Testing Condition

Using a one way between-subjects ANOVA examining gender mean differences between all testing conditions and post measures of state self-esteem, including subscales (performance, social, and appearance self-esteem) no significant differences were found overall or in the related subscales. Using a one way between-subjects ANOVA examining gender mean differences between all testing conditions and self-esteem change (including subscales) no significant differences were found overall or in the related subscales. Table 22 contains test statistics.

Table 22.

Testing Condition and Unintended Effects: Gender Self Esteem

Variable	Test statistic and significance level[+]	Body-Image[a]		Health[b]		Non-Health[c]		Control[d]	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Males									
Post overall state self-esteem	*F* = .40 ; .75	80.69	(10.80)	75.88	(15.30)	75.46	(15.47)	78.27	(11.22)
Post performance self-esteem	*F* = .24 ; .87	28.46	(5.03)	28.13	(4.91)	26.77	(6.58)	28.18	(5.13)
Post social self-esteem	*F* = .09 ; .96	27.31	(5.34)	26.00	(6.35)	26.54	(5.53)	26.73	(5.78)
Post appearance self-esteem	*F* = 1.19 ; .33	24.92	(3.48)	21.75	(6.18)	22.15	(4.56)	23.36	(3.75)
Self-esteem change	*F* = .19 ; .91	-0.25	(6.58)	-1.25	(5.68)	0.42	(6.07)	0.64	(5.22)
Performance self-esteem change	*F* = .07 ; .98	-0.42	(3.32)	-0.13	(2.03)	-0.08	(2.75)	-0.55	(2.73)
Social self-esteem change	*F* = .33 ; .81	-0.42	(3.48)	-0.38	(2.92)	0.58	(3.09)	0.45	(2.58)
Appearance self-esteem change	*F* = 1.27 ; .30	0.58	(1.24)	-0.75	(1.75)	-0.08	(2.47)	0.73	(1.68)
Females									
Post overall state self-esteem	*F* = .12 ; .95	71.63	(16.34)	75.06	(15.88)	73.54	(11.64)	74.42	(11.85)
Post performance self-esteem	*F* = .51 ; .68	26.75	(6.02)	28.88	(4.47)	27.31	(3.77)	27.33	(5.18)
Post social self-esteem	*F* = .20 ; .89	24.50	(7.89)	25.47	(7.08)	25.46	(5.22)	26.67	(4.60)
Post appearance self-esteem	*F* = .02 ; 1.00	20.38	(5.40)	20.71	(6.15)	20.77	(4.66)	20.42	(4.03)
Self-esteem change	*F* = .21 ; .89	0.50	(2.00)	-0.06	(6.65)	0.54	(5.55)	1.58	(5.18)
Performance self-esteem change	*F* = .39 ; .76	0.00	(1.85)	0.71	(3.04)	0.23	(2.31)	1.08	(2.35)
Social self-esteem change	*F* = .68 ; .57	0.63	(1.60)	-0.47	(2.29)	-0.31	(2.46)	0.58	(3.00)
Appearance self-esteem change	*F* = .39 ; .76	-0.13	(1.25)	-0.29	(3.02)	0.62	(2.43)	-0.08	(1.73)

Note: Higher mean values indicate higher self-esteem. Scores range from 20-100 for overall, 7-35 for the performance subscale, 7-35 for the social subscale, and 6-30 for the appearance subscale.

[a] males *n* =12, females *n* =8. [b] males *n* =8, females *n* =17. [c] males *n* =12, females *n* =13. [d] males *n* =11, females *n* =12.

[+] using Analysis of Variance.

Gender Mood by Testing Condition

Using a one way between-subjects ANOVA examining gender mean differences between all testing conditions and post measures of mood, including subscales (anxiety, depression, and hostility) no significant differences were found overall or in the subscales. Using a one way between-subjects ANOVA examining gender mean differences between all testing conditions and mood change (including subscales) no significant main effects were found overall or in the related subscales. Table 23 contains test statistics.

Table 23.

Testing Condition and Unintended Effects: Gender Mood

Variable	Test statistic and significance level[+]	Body-Image[a]		Health[b]		Non-Health[c]		Control[d]	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Males									
Post overall mood	$F = 1.43$; .25	29.15	(12.63)	24.88	(10.33)	35.31	(16.21)	26.18	(10.92)
Post anxiety	$F = 2.11$; .11	6.92	(3.01)	4.88	(3.14)	8.31	(3.77)	5.91	(3.02)
Post depression	$F = 1.00$; .40	11.46	(6.32)	12.13	(5.17)	15.15	(7.71)	11.36	(5.03)
Post hostility	$F = 1.74$; .17	10.77	(4.23)	7.88	(3.80)	11.85	(5.27)	8.91	(3.75)
Mood change	$F = 1.95$; .14	4.23	(7.17)	0.00	(4.69)	0.46	(5.46)	-1.00	(4.58)
Anxiety change	$F = 1.72$; .18	1.08	(2.66)	-0.50	(2.14)	0.31	(1.32)	-0.64	(1.86)
Depression change	$F = .39$; .76	1.54	(3.71)	0.75	(2.05)	0.31	(3.30)	0.36	(3.20)
Hostility change	$F = 2.07$; .12	1.62	(2.93)	-0.25	(2.25)	-0.15	(2.76)	-0.73	(1.62)
Females									
Post overall mood	$F = .50$; .69	34.25	(14.14)	30.88	(20.24)	25.85	(12.20)	31.67	(16.30)
Post anxiety	$F = 1.00$; .40	9.00	(5.63)	7.82	(5.57)	5.69	(3.07)	7.00	(3.28)
Post depression	$F = .23$; .87	15.13	(6.03)	12.88	(9.66)	12.08	(7.40)	13.67	(9.10)
Post hostility	$F = .90$; .45	10.13	(3.56)	10.18	(5.95)	8.08	(3.38)	11.00	(4.41)
Mood change	$F = .46$; .71	-0.25	(3.88)	2.06	(5.09)	1.69	(6.52)	0.00	(7.48)
Anxiety change	$F = 1.28$; .29	0.75	(1.28)	0.47	(2.27)	0.00	(2.20)	-0.83	(1.99)
Depression change	$F = .53$; .66	-0.13	(1.64)	0.82	(2.51)	1.46	(4.18)	0.08	(4.06)
Hostility change	$F = .78$; .51	-0.88	(2.36)	0.76	(2.70)	0.23	(2.28)	0.75	(3.28)

Note. Higher mean values indicate more negative mood. Scores range from 0-91 for overall, 0-21 for the anxiety subscale, 0-40 for the depression subscale, and 0-30 for the hostility subscale.

[a] males $n = 13$, females $n = 8$. [b] males $n = 8$, females $n = 17$. [c] males $n = 13$, females $n = 13$. [d] males $n = 11$, females $n = 12$.

[+] using Analysis of Variance.

Gender Summary: Unintended Effects by Study Group

Gender analysis for unintended effects revealed that males in this sample had less negative willpower weight attitudes when shown body-image versus control PSAs.

Gender: Ad Evaluation and Change Intentions

Gender Ad Evaluation by Testing Condition

A one way between-subjects ANOVA examining gender mean differences between all testing conditions and ad evaluation, including subscales, revealed a significant main effect among males for PSA attitude (ad evaluation and believability were close to significance) and a significant main effect among females for ad evaluation and all related subscales.

For males, Tukey's HSD post-hoc comparison demonstrated that those exposed to obesity prevention non-health PSAs had a better attitude rating than those exposed to control PSAs (a large effect size using Cohen's *d* of 1.29 was calculated between non-health and control attitude scores). Tukey's HSD post-hoc comparison also demonstrated that those exposed to health PSAs found them significantly more believable than those exposed to control PSAs (a large Cohen's *d* effect size of 1.91 was also calculated between non-health and control believability scores).

For females, Tukey's HSD post-hoc comparison revealed significant pairwise differences for ad evaluation and related subscales. Control PSAs received lower overall ad evaluations and attitude ratings than other conditions and lower believability scores than obesity prevention body-image and health PSAs. Effect sizes using Cohen's *d* were large when control ad evaluations were calculated with each related group score: 1.94 for body-image, 1.59 for health, and 1.07 for non-health. Pairwise effect sizes using Cohen's *d* were also large when control attitude ratings were calculated with each related group score: 2.03 for body-image, 1.52 for non-health, and 1.24 for health. Likewise, effect sizes using Cohen's *d* were large when control believability ratings were calculated with body-image and health: 1.90 and 1.42 respectively.

Health PSAs were also found to be more readable than non-health PSAs (a large Cohen's *d* effect size of 1.19 was calculated). Table 24 contains test statistics and Figures 9 - 10 contains male and female box plots for ad evaluation and subscales.

Table 24.

Testing Condition and Gender Ad Evaluation

Variable	Test statistic and significance leve^{l+}	Body-Image^{a}		Health^{b}		Non-Health^{c}		Control^{d}	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Males									
Overall ad evaluation	*F* = 2.73 ; .06*	178.08	(35.12)	198.43	(19.94)	193.46	(42.80)	158.82	(27.89)
Attitude	*F* = 3.67 ; .02**	64.39_{ab}	(14.02)	67.00_{ab}	(14.91)	74.64_{a}	(18.42)	52.36_{b}	(16.03)
Believability	*F* = 2.81 ; .05*	72.23_{ab}	(20.05)	84.14_{a}	(11.39)	74.46_{ab}	(23.26)	59.09_{b}	(14.58)
Readability	*F* = 1.81 ; .16	41.46	(7.89)	47.29	(5.38)	44.36	(8.55)	47.36	(4.34)
Females									
Overall ad evaluation	*F* = 8.10 ; .00**	212.57_{a}	(21.42)	206.19_{a}	(25.59)	192.31_{a}	(28.00)	160.58_{b}	(31.36)
Attitude	*F* = 7.24 ; .00**	78.14_{a}	(7.88)	70.69_{a}	(12.90)	74.77_{a}	(13.01)	52.67_{b}	(15.92)
Believability	*F* = 3.56 ; .02**	90.86_{a}	(13.90)	85.63_{a}	(16.19)	74.85_{ab}	(13.11)	63.50_{b}	(14.91)
Readability	*F* = 8.06 ; .01**	43.57_{ab}	(7.61)	49.88_{a}	(6.76)	42.69_{b}	(5.19)	44.42_{ab}	(6.68)

Note. Higher mean values indicate greater likeability. Scores range from 40-280 for overall, 16-112 for the attitude subscale, 16-112 for the believability subscale, and 8-56 for the readability subscale. Means in the same row that do not share subscripts ($_{a}$ or $_{b}$) differ at $p < .05$ in the Tukey honestly significant difference comparison. Advise caution when interpreting these results due to small sample sizes.

^{a} males n = 13, females n = 7. ^{b} males n = 7, females n = 16. ^{c} males n = 11, females n = 13. ^{d} males n = 11, females n = 12.

* Overall ad evaluation and believability are very close to significance. $^{**}p < .05$. $^{+}$ using Analysis of Variance.

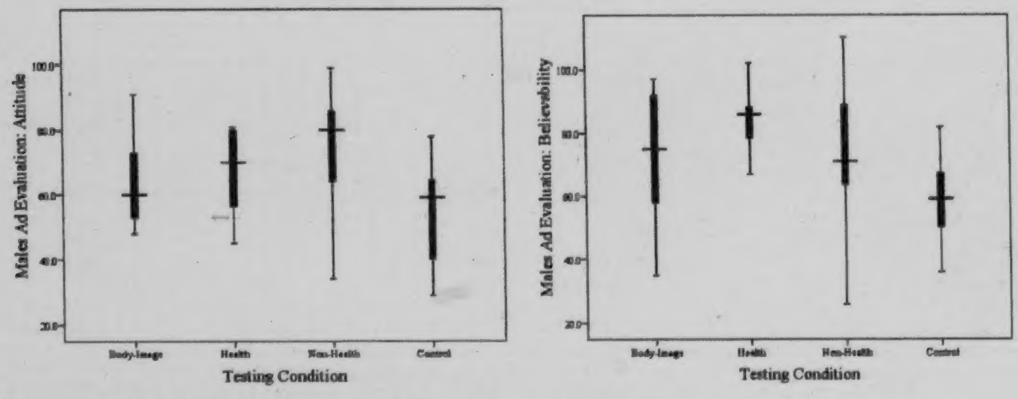


Figure 9. Box plots for ad evaluation subscales in males.

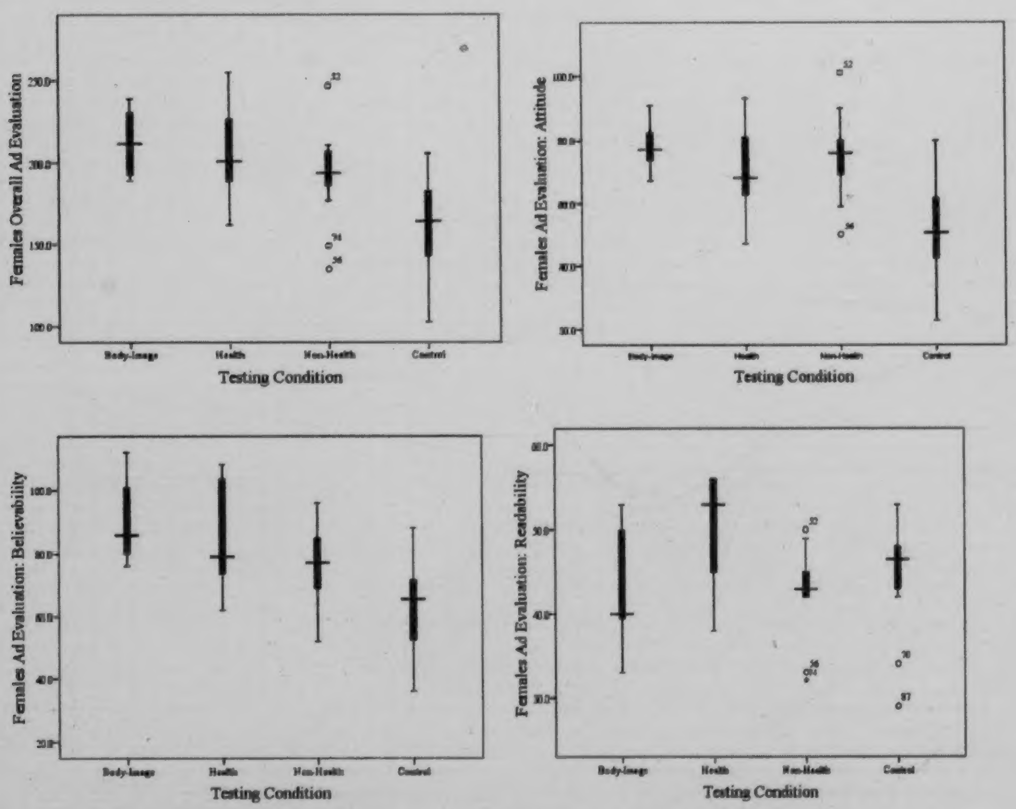


Figure 10. Box plots for ad evaluation and related subscales in females.

Gender Behaviour Intention by Testing Condition

A one way between-subjects ANOVA examining gender mean differences across testing conditions and post measures of physical activity/healthy eating behaviour intention, including subscales (planning and expectation) found no significant differences.

Using a one way between-subjects ANOVA examining gender mean differences between all testing conditions and behaviour change, a significant main effect among males for the healthy eating planning change subscale and overall physical activity change was found. Tukey's HSD post-hoc comparisons revealed significant pairwise differences: males shown obesity prevention health PSAs were more likely than those shown control PSAs to demonstrate an increase in pre-post eating planning (a large effect size of 1.40 using Cohen's *d* was found between health and control scores). Tukey's HSD post-hoc comparison also demonstrated that males shown health PSAs were more likely than those shown non-health PSAs to increase their overall physical activity intention (although the effect size of this relationship was small at .20 between health and non-health overall physical activity intention). The same relationship existed for the physical activity expectation subscale (although the effect size was also small at .07). Table 25 reveals test statistics and Figure 11 depicts male box plots for behaviour change.

Table 25.

Testing Condition and Gender Behaviour Intention

Variable	Test statistic and significance level^{+}	Body-Image^{a}		Health^{b}		Non-Health^{c}		Control^{d}	
		M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Males									
Post overall healthy eating intention	*F* = .22 ; .88	4.24	(1.27)	4.69	(1.77)	4.60	(1.45)	4.28	(1.81)
Post healthy eating planning	*F* = .47 ; .71	4.19	(1.38)	5.00	(1.77)	4.65	(1.49)	4.41	(1.84)
Post healthy eating expectation	*F* = .11 ; .95	4.27	(1.27)	4.38	(1.92)	4.50	(1.50)	4.14	(1.80)
Post overall physical activity intention	*F* = .92 ; .44	5.26	(1.20)	5.51	(.58)	4.94	(1.27)	5.56	(.48)
Post physical activity planning	*F* = 1.54 ; .22	5.12	(1.31)	5.75	(.46)	4.92	(1.24)	5.59	(.49)
Post physical activity expectation	*F* = .66 ; .58	5.39	(1.19)	5.25	(.85)	4.92	(1.34)	5.50	(.67)
Overall healthy eating change	*F* = 2.12 ; .11	0.09	(.28)	0.68	(.84)	0.11	(.96)	-0.06	(.32)
Healthy eating planning change	*F* = 3.22 ; .03**	0.08_{ab}	(.28)	1.13_{a}	(1.03)	0.15_{ab}	(1.38)	-0.05_{b}	(.35)
Healthy eating expectation change	*F* = .46 ; .71	0.12	(.46)	0.25	(1.13)	0.04	(.59)	-0.09	(.38)
Overall physical activity change	*F* = 3.06 ; .04**	-0.17_{ab}	(.31)	0.41_{a}	(.75)	-0.27_{b}	(.65)	0.04_{ab}	(.50)
Physical activity planning change	*F* = 1.10 ; .36	-0.27	(.60)	0.63	(1.06)	-0.38	(.77)	0.05	(.82)
Physical activity expectation change	*F* = 2.80 ; .05*	-0.08_{ab}	(.28)	0.19_{a}	(.53)	-0.15_{b}	(.63)	0.05_{ab}	(.27)
Females									
Post overall healthy eating intention	*F* = .20 ; .90	5.05	(.98)	5.08	(1.04)	4.89	(.66)	4.84	(1.02)
Post healthy eating planning	*F* = .26 ; .85	5.00	(1.04)	5.29	(.94)	5.12	(.74)	5.25	(.75)
Post healthy eating expectation	*F* = .57 ; .64	5.06	(.94)	4.82	(1.21)	4.65	(.88)	4.42	(1.44)
Post overall physical activity intention	*F* = .91 ; .44	5.21	(.77)	5.29	(1.32)	5.43	(.84)	4.78	(.93)
Post physical activity planning	*F* = .90 ; .45	5.25	(.76)	5.38	(1.19)	5.58	(.86)	4.96	(.81)
Post physical activity expectation	*F* = .90 ; .45	5.13	(.88)	5.18	(1.48)	5.27	(.99)	4.54	(1.23)
Overall healthy eating change	*F* = 1.15 ; .34	0.53	(.63)	0.35	(.36)	0.18	(.35)	0.29	(.41)
Healthy eating planning change	*F* = .86 ; .47	0.13	(.44)	0.35	(.55)	0.15	(.47)	0.13	(.23)
Healthy eating expectation change	*F* = 2.09 ; .11	0.94	(.94)	0.35	(.55)	0.23	(.53)	0.46	(.69)
Overall physical activity change	*F* = 1.04 ; .38	0.23	(.52)	0.08	(.27)	-0.04	(.54)	-0.11	(.49)
Physical activity planning change	*F* = 1.04 ; .39	0.19	(.46)	0.00	(.25)	-0.08	(.61)	-0.17	(.49)
Physical activity expectation change	*F* = .61 ; .61	0.25	(.80)	0.18	(.39)	0.00	(.65)	-0.08	(.85)

Note . Higher mean values indicate greater behaviour intention. Scores range from 1-6 for overall healthy eating or physical activity intention and all subscales. Means in the same row that do not share subscripts ($_{a}$ or $_{b}$) differ at $p < .05$ in the Tukey honestly significant difference comparison. Advise caution when interpreting these results due to small sample sizes.

[a] males n =13, females n =8. [b] males n =8, females n =17. [c] males n =13, females n =13. [d] males n =11, females n =12.

* Physical activity expectation change is very close to significance. **$p < .05$. $^{+}$ using Analysis of Variance.

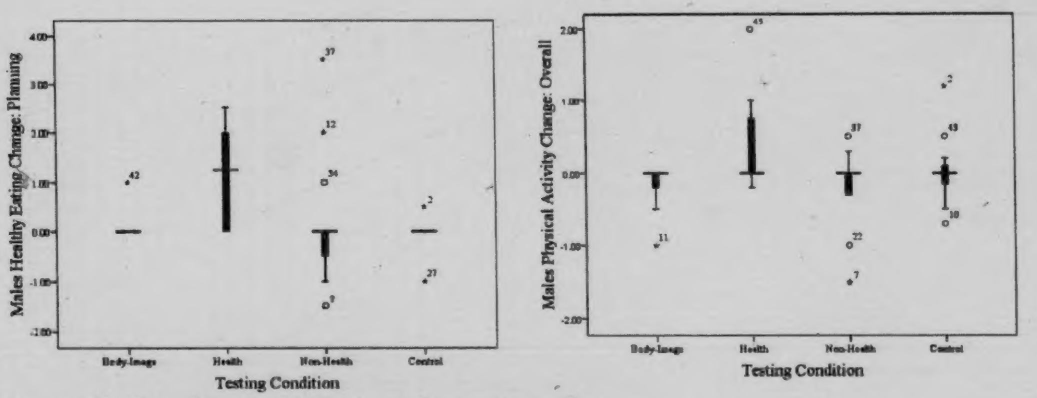


Figure 11. Box plots for behaviour change in males.

Gender Summary: Ad Evaluation and Change Intentions by Study Group

Gender exploratory analysis revealed that males found obesity prevention non-health PSAs to be more likeable (for attitude) in comparison to control PSAs, while females gave low ad evaluations for control PSAs. However, females also found health PSAs to be more readable than non-health ones. When behaviour intention was examined, men indicated changes between pre and post administration, while women remained stable. Interestingly, males shown health PSAs were more likely to plan to eat healthy (in comparison to control) and participate in physical activity (in comparison to non-health).

Phase IV Exploratory Results: Gender Summary

Exploratory research allowed several observations to be made in relation to the third study objective (determine the immediate effects of exposure to PSAs in adolescents grouped according to health focus, body-image and unrelated messages) as well as the fourth study objective (aspects of the design of the PSAs that might inform more effective materials for new social marketing approaches for the prevention or reduction of adolescent obesity), these include:

1. Exposure to obesity prevention body-image PSAs seemed to cause males in this study to have less negative willpower weight attitudes;
2. Adolescent males in this sample seemed to find non-health ads to be more likeable; whereas, women seemed to find obesity prevention health PSAs to be more readable than non-health ones;
3. Males in this study seemed to be more likely to indicate behaviour change aspirations than females after being exposed to obesity prevention PSAs, particularly when shown health PSAs.

CHAPTER 5: DISCUSSION

Summary of Findings

The current study had four objectives:
1. Identify PSAs aimed at obesity prevention among adolescents and group them according to key theoretical characteristics;
2. Explore general reactions to obesity prevention PSAs in adolescent focus groups and validate the groupings;
3. Determine the immediate effects of exposure to obesity prevention PSAs in adolescents grouped according to body-image, health focus, non-health focus and control messages; and,
4. Identify aspects of the design of the tested PSAs that might inform more effective materials for new social marketing approaches for the prevention or reduction of adolescent obesity.

It was hypothesized that obesity prevention body-image focused PSAs would be significantly more likely to induce negative weight attitudes, lower self-esteem and stimulate negative mood compared to the control condition. It was also predicted that obesity prevention non-health focused PSAs would receive more positive ad evaluations and result in more change intentions compared with health focused PSAs.

Unintended Effects by Testing Condition

Overall the hypothesis that obesity prevention body-image focused PSAs would be significantly more likely to induce negative effects was only partially supported, suggesting that more research is required before specific conclusions can be made about the unintended effects of obesity prevention body-image focused PSAs. As predicted, exposure to obesity prevention body-image PSAs among adolescents in this sample seemed to increase anxiety when compared to exposure to unrelated control PSAs. However, contrary to predictions, exposure to obesity prevention body-image PSAs did not cause negative weight attitudes or decreases in state self-esteem among participants.

Weight Attitude by Testing Condition

In this study, obesity prevention body-image PSAs did not cause negative weight attitudes. Instead, weight attitude scores for the body-image PSAs were actually less negative than other conditions. Interestingly, the fear of fat subscale was close to significance with more negative weight attitudes being present in the health condition; however, planned comparisons did not reach significance.

One explanation for the lack of significance for weight attitude is that main experiment adolescents may not have felt comfortable expressing negative weight attitudes using the AAWAD (Crandall, 1994). It is not uncommon for research participants, particularly adolescents, to under-report undesirable traits and behaviours and over-report desirable ones when given self-reported measures of attitudes, also known as *social desirability* *bias* (Klesges et al., 2004; Lissner, Heitmann, & Bengtsson, 2000). It is possible that main experiment participants may have been less willing to express negative weight attitudes in the AAWAD as a result of feeling that such attitudes were socially unacceptable.

Since the AAWAD scale was originally developed with undergraduate university students (Crandall, 1994) and not adolescents, it may not have been appropriate to use with adolescent populations. In fact, during the pre-test, adolescents expressed that this scale was too critical of overweight and obese individuals (Appendix T contains pre-test results).

State Self-Esteem by Testing Condition

Contrary to predictions, no significant decreases were found in overall state self-esteem or the related subscales: academic performance, social evaluation, and appearance following exposure to obesity prevention body-image PSAs among adolescents. Instead, post measures of overall self-esteem were higher in the body-image group compared to other conditions. A trend in this direction was also found for appearance self-esteem.

The current study did not make a distinction between adolescents with high versus low appearance self-esteem by testing condition. O'Dea (2005) argued that obesity prevention mass communication efforts that incorporate body-image focused communication messages may suffer from boomerang effects, such as poor self-esteem, among adolescents of normal weight that perceive themselves to be fat. It is possible that had a distinction been made between subjects with low versus high self-esteem that such a relationship may have been found. Another consideration is that the adolescents sampled in the current study did not perceive themselves to be fat and thus were unaffected by body-image PSAs.

The *social comparison theory* (Festinger, 1954) may also be used to interpret this finding. The social comparison theory states that individuals evaluate themselves in relation to similar others on ability, attributes, and attitudes. When evaluating themselves, individuals will either make upward comparisons with perceived superior targets (resulting in lower self evaluations) or they will make downwards comparisons with perceived inferior targets (resulting in greater self evaluations). For body-image self evaluations, people often make upward comparisons with societal ideals (e.g., thin models) resulting in lower body satisfaction or downward comparisons with ideals contrary to societal expectations (e.g., overweight or obese models) thus resulting in higher body satisfaction (Duckitt, 1992; Heinberg & Thompson, 1992; Major, Testa, & Bylsma, 1991; Thompson, Heinberg, & Tantleff, 1991; Wills, 1981). Downward comparisons serve the purpose of maintaining a positive self-image to offset the abundance of physical ideals already present in the media (O'Brien, Hunter, Halberstadt, & Anderson, 2007).

A key point to consider with the social comparison theory is that individuals make comparisons with others that are similar on certain attributes, such as weight as may be the case with body-image. Thus, the results achieved in the current study might have been different had the body-image PSAs been rated by overweight or obese adolescents. Since weight was not a selection criteria for the adolescents in the current study, the adolescents sampled may be likely to make downward comparisons when exposed to obese or overweight images, which may reinforce their own self-esteem.

Mood by Testing Condition

Aligned with research in the field on the unintended effects of obesity prevention communication messages (e.g., O'Dea, 2005; Szwarc, 2005; Taylor et al., 2005), main experiment results illustrate that exposure to obesity prevention body-image PSAs seemed to stimulate anxiety among adolescents sampled.

The relationship between anxiety and body-image PSAs is an interesting one in the context of internalizing idealized images. Haines and Neumark-Sztainer (2006) discussed how societal pressures to conform to the ideal shape and size may result in an internalization of the ideal body-shape. They presented a model outlining a sequential link between media exposure, thin-ideal internalization, body dissatisfaction, and anxiety. The results from the current study support the relationship discussed by Haines and Neumark-Sztainer (2006) and suggest that exposure to overweight or obese images, may cause internalization of the thin ideal. Regardless, it is apparent that body-image PSAs are a sensitive marketing tool to use for obesity prevention purposes among adolescents.

Instead of internalizing the thin ideal, adolescents in the current study may have became more anxious after rating the body-image PSAs due to a fear of the perceived consequences associated with being overweight or obese (Szwarc, 2005). Since the body-image PSAs depicted overweight and obese individuals who had to make large lifestyle changes to lose weight (e.g., one body-image PSA tagline mentioned "eats healthier and skips deserts") adolescents may have felt a threat towards their freedom to engage in enjoyable behaviours. Interestingly, the original explanation of boomerang effects in context to the psychological theory of reactance (Brehm, 1966) suggested that unintended effects result from individuals feeling their freedom to engage in a particular behaviour is being threatened or eliminated. It is possible that adolescents in the current study became anxious at the thought of behaviours they enjoy being challenged, such as eating deserts. Alternatively, adolescents may have felt some concern about the health effects of the behaviors in which they had previously engaged.

Ad Evaluation and Change Intentions by Testing Condition

The hypothesis for ad evaluation and change intentions was not supported. Obesity prevention non-health focused PSAs did not receive more positive ad evaluations and change intentions in comparison to health ones. However, several findings suggest that obesity prevention (either health or non-health focused) PSAs can have significant effects on adolescent populations for likeability and behaviour intentions. Likewise, findings also supported the notion that the use of long term health information may not be the best way to market healthy eating and active living to adolescents.

Ad Evaluation by Testing Condition

Obesity Prevention PSAs.

Adolescents in this sample found obesity prevention health PSAs more readable in comparison to obesity prevention body-image and non-health PSAs.

Likely this finding is due to the visual appeal and readability of two health PSAs: the hamburger and pie Region of Peel ads (Appendix U). Both PSAs depicted brightly coloured, simplistic visuals on a white background with limited text juxtaposed beside the visuals. Research on effective advertising is aligned with the characteristics of these ads. For instance, colour has been shown to be particularly persuasive when juxtaposed on a dominant white background. Simple and well-positioned text has also been cited by researchers as easily comprehendible and attention grabbing due to the relative cognitive ease of processing such text (Bovée & Arens, 1982).

In the focus groups, adolescents were enthusiastic about the visual appeal and readability of the hamburger and pie ads. These were particularly appealing for their simple, realistic, colourful visuals; minimal text alongside the visual; white backgrounds; and realistic pictures. Unfortunately, although efforts were made to make all PSAs as similar as possible (with the exception of their theoretical grouping) this result is likely related to the PSA selection.

Control PSAs.

The finding that adolescents rated all groups of obesity prevention experimental PSAs (body-image, health, and non-health) to be more appealing than unrelated control PSAs featuring hand washing, sun safety, seat belt use, and volunteerism was also contrary to predictions. This finding arose for all measures of ad evaluation: attitude (coolness, likeability, and interest), believability (believability, truth, and behaviour motivation) and readability (readability and understanding). It may be explained according to the *salience effect* (Zimbardo & Lieppe, 1991), which suggests that subjects give more weight and attention to concepts that are relevant and important to them and their lives. In the current case, it is possible that the adolescents sampled found the obesity prevention PSAs to be more relevant to them due to attention that is currently being given to obesity and body weights in the media and by government health departments (O'Dea, 2005). Market research has shown that adolescents are often exposed to advertisements on entertainment, fast-food, and snacks (Mixon, 2001). It is likely that adolescents in the current study also found the obesity prevention advertisements to be more appealing because they were used to being exposed to PSAs about entertainment-related behaviours (e.g., some PSAs depicted sports that might be entertaining to adolescents) or food-related products and behaviours (e.g., some PSAs featured fast-food or snacks such as hamburgers and pies).

Since control PSAs were not tested in focus group research prior to the main experiment, adolescents may also have regarded them as unprofessional looking or irrelevant. Adolescents demand well-designed and professional ads as a result of the quantity and quality of private-industry marketing efforts they are already exposed to. Adolescents are bombarded with an array of marketing products on a daily basis: whether it is McDonald's new TV commercial placements or other related products (Goldberg, Gorn, Peracchio, & Bamossy, 2003). These marketing efforts are professional productions and appeal to adolescents because in-depth market and segmentation research has occurred before marketing campaign release (Mixon, 2001). A common theme that emerged in focus groups was how marketing savvy participants considered themselves to be.

Control PSAs may have also received low ad evaluations because of the multitude of health behaviours featured in the ads: hand washing, sun safety, seat belt use, and volunteerism. Stice, Shaw, & Marti (2006) argued that prevention efforts focusing on a few concepts versus a broad array of concepts may be easier to process and more successful in changing health-related behaviour. In the case of the current research, it is likely that obesity prevention PSAs were given higher ad evaluations because they focus on two activities: healthy eating and physical activity. Thus, obesity prevention PSAs may have been easier to process as a group than the control PSAs which featured four health activities.

Change Intentions by Unintended Effects

Contrary to predictions that non-health versus health focused PSAs would receive more change intentions, exposure to obesity prevention health PSAs instead appeared to have increased intentions to eat healthy among adolescents. This significant finding existed for adolescents exposed to health ads in comparison to adolescents exposed to control PSAs.

In the case of change intentions, it is interesting that adolescents showed intentions related to healthy eating (plans to eat healthy) but not intentions related to physical activity following exposure to obesity prevention health PSAs. This may have been due to the messages in the eating-related health PSAs compared to the physical activity health PSAs. Specifically, the former (eating-related health PSAs) featured the current statistics of the obesity epidemic, while the latter (physical activity health PSAs) featured long term health consequences associated with obesity.

The results of the current study expand on Witte's (1997) argument that immediate benefits of a desired behaviour are reinforcements. Current statistics about a health issue (in this case obesity) may also have the same effect on cognitive processing, interest, and message involvement. On the other hand, the fact that no physical activity intentions were found in the health PSAs supports the arguments of Pechmann and Ratneshwar (1994) that long term health rewards are not appealing to adolescents because they feel personally invulnerable to such risks. Interestingly, during the focus groups, adolescents commended the nutrition-related health PSAs for containing brief, easy to digest and relevant statistics about Canadian obesity, but criticized the physical activity health PSAs for the irrelevant long term health information that they found unappealing.

This result may also explain the advertisement effectiveness of the eating-related hamburger and pie PSAs located in the health group. Due to their visual appeal, these ads may have been easier to process cognitively in comparison to the other physical activity ads in the same group (Bovée & Arens, 1982). Whether the effect is due solely to the visual appeal or the current statistics in the eating-related health PSAs is unknown. This finding may also be influenced by social desirability where participants over-reported desirable traits, such as healthy eating intentions (Klesges et al., 2004; Lissner, Heitmann, & Bengtsson, 2000). However, this explanation does not account for the lack of significant physical activity intentions found in conjunction with significant healthy eating intentions.

Gender: Unintended Effects

Interestingly, exploratory analysis was particularly useful for the current study. Although this analysis was conducted without specific hypotheses about gender differences, the findings suggest that adolescent males and females are affected by obesity prevention PSAs in different ways. For unintended effects, results of the exploratory analyses suggest that exposure to obesity prevention body-image PSAs may have caused males, but not females to have less negative opinions that people are overweight because they have no willpower. No significant differences were found for gender and state self-esteem or mood by testing condition.

Gender Weight Attitude by Testing Condition

Following exposure to obesity prevention body-image PSAs, males in the current sample had less negative opinions that people were overweight because they have no willpower.

It may be that males sampled here paid more attention to certain body-image PSAs than others, which may have in turn projected different messages to them. Body-image researchers have demonstrated that males actually place more emphasis on facial features when evaluating body satisfaction; whereas, females place more emphasis on body parts (Silberstein, Striegel-Moore, Timko, & Rodin, 1988). In the current study, only one in four body-image PSAs contained facial components, which males may have been more likely to pay attention to. This ad did not feature willpower messages, but a happy looking obese women walking, with the tagline "fight obesity - prevent diabetes".

Another possibility for this finding is that adolescent males in the current study may have felt less responsibility to control their weight through individual willpower in comparison to females and thus were more sympathetic with the individuals featured in the body-image PSAs. Researchers, such as Stice et al. (2006) suggested that males pick up on different norms and messages in comparison to females when exposed to body-image messages. Females in comparison felt more responsibility to control their weight through individual willpower and control since they were more frequently exposed to willpower-related weight messages. O'Dea (2005) also supported this notion by noting the exponential rise in messages geared towards females about weight control dating back to the 1970s.

Gender: Ad Evaluation and Change Intentions

When gender was examined for ad evaluation by testing condition (without a hypothesis of the intended effects), several interesting significant results were found for all ad groupings, with the exception of body-image PSAs. On the other hand, when gender was examined for change intention by testing condition, significant results were found among adolescents in the health and non-health conditions, but not in other conditions.

Gender Ad Evaluation by Testing Condition

Obesity Prevention PSAs.

Females found obesity prevention health PSAs to be more readable (easy to read and understand) than non–health ones. This significant finding did not exist among males. Instead, males exposed to obesity prevention non-health PSAs in the current study had a better attitude towards such ads (in terms of the PSAs being cool, likeable, appealing to friends, and interesting/eye catching) in comparison to control PSAs.

The salience effect (Zimbardo & Lieppe, 1991) may have played a role in how adolescent males and females sampled rated the obesity prevention ads. The males and the females sampled may have been drawn to different characteristics in each ad grouping. In the case of females, they may have been drawn to images of dietary restraint (present in the health PSAs), while males may have been drawn to images of physical activity (present in the non-health PSAs). Specifically, the healthy eating PSAs from the health condition depicted dietary restraint (the hamburger PSA depicted a single versus triple patty burger, while the pie PSA depicted slices of a blueberry pie). In the case of the non-health condition, three of the four PSAs contained physical activity messages.

Males in the current study may have related more to the physical activity non-health PSAs because they are more accustomed to being exposed to such messages, while females may be more accustomed to dietary-restraint messages. Andersen and DiDomenio (1992) showed that popular magazines geared towards males more often contained exercise-related messages, while those geared towards females more often contained diet-related advertisements and messages. O'Dea (2005) also argued that females were more often exposed to messages about dietary restraint in comparison to men. O'Dea (2000) even went as far as stating that young females described dieting as healthy eating – with the two being part and parcel with one another.

Control PSAs.

Lower overall ad evaluations and attitude ratings were found for control PSAs in comparison to experimental obesity prevention PSAs among female participants, while results in the same direction were found for male participants.

Behaviour Intention by Gender

Male research participants endorsed behaviour intentions to eat healthy and to expect to participate in physical activity following obesity prevention PSA exposure while female research participants did not. For males, both physical activity and healthy eating change intentions were found between pre and post PSA administration. Males in the health PSA condition were more likely to show eating intention increases when compared to those in the control PSA condition. Males in the non-health PSA group also showed physical activity intentions, but the effect size of this significant relationship was small.

Men in the non-health PSA group may have been more attuned to the physical activity messages in the non-health group as three of four PSAs contained such messages and research documenting male-focused media has shown a relationship between exercise-related messages (Andersen & DiDomenio, 1992). However, the same conclusion cannot be made about the nutrition-related PSAs in the health condition. One possibility is that males may find visual material more evocative than females (Barthel, 1992). This finding may also relate to social desirability because the health PSAs depicted poor eating habits and physical inactivity as undesirable behaviours. Adolescent male participants may also have felt more of a need to impress a female researcher than the adolescent female participants did.

Limitations

Selection

Research Participants

The population of interest was Canadian adolescents between 12 and 18 years of age. However, since only participants from urban areas in Calgary were used, the majority of which were Caucasian, we cannot assume that they were representative of Canadian adolescents in general.

Systematic Snowball Sampling

The current research study employed systematic snowball sampling to recruit adolescents (Bernard, 1999; Goodman, 1961). One weakness is that the use of random sampling was not employed. Random sampling has been cited as a more appropriate selection method where quantitative research methods are employed and there is an intention to generalize to the population (Bernard, 1999). The weakness with using systematic snowball sampling instead of random sampling is the potential lack in external validity (Kerlinger & Lee, 200). In the current study, random sampling was not feasible due to several factors: a hard to reach adolescent sample, limitations of sampling frames, a sensitive study topic, as well as limited time (Goodman, 1961). Therefore, systematic snowball sampling was considered the only feasible method.

Many challenges in adequately securing research participants for the current study were faced; such as, reaching community and educational institute networks willing to participate, starting referral chains, verifying respondent eligibility, securing appropriate research settings, scheduling research sessions, and obtaining adequate participation numbers for research sessions. Although the participants were originally recruited through youth groups, efforts were made to keep the sample as random as possible. For instance, participating community facilities and educational institutes were selected from a wide variety of socio-economic neighbourhoods around Calgary.

Goodman (1961) indicated that time and resources are obvious trade offs when considering random versus systematic snowball sampling. Random sampling often results in a more representative sample, but due to the time allocation involved in such a sampling method, less time may be devoted to studying the sample. On the other hand, systematic snowball sampling may result in a smaller less representative sample, but allow for the ability to study the sample more intensively as less time is devoted to sampling in the early research stages. In the current case, since the research design incorporated three participant data collection phases: pre-test, focus groups, and pre-post surveys, the decision was made to use a smaller sample for the purpose of more intensive study.

Chance

Several variable associations were underpowered and may have been more substantive had a larger sample size been employed. In particular, there were several cases where relationships between variables were very close to significance and had the sample size been larger a significant result may have been found. For instance, post fear of fat by testing condition, anxiety change by testing condition (Tukey HSD planned comparisons reached significance) and overall ad evaluation by testing condition for males were all close to test significance.

Research Design

Focus Group Limitations

Kerlinger and Lee (2000) indicated that focus group research is a good technique to use when the research goal is to improve heath education, research, practice, and theory. The main strength of focus group research is that it allows for a maximum understanding of a social process. On the other hand, the main weakness is that data are often nongeneralizable due to limited sample size (Bernard, 1999; Faugier & Sargeant, 1997).

To allow for complete disclosure in a focus group, participants should not have a personal relationship with one another (Bernard, 1999). If focus group research participants are familiar with one another, peer influence can often inhibit information disclosure. One weakness with the focus group participants used in the current study is that many of them knew one another through youth group involvement. Another weakness of the focus group environment is that often a few individuals within the group will dominate the conversation. In the current study, an effort was made to get the opinions of all focus group participants, through several probing techniques.

Main Experiment Limitations

Random Error.

Random error is caused by any factors that randomly affect measurement of the variable across the sample (Trochim, 2006). Encouragingly, trials which randomly assigned participants to a condition have been found to produce larger intervention effects than those using other approaches (Stice et al., 2006).

To reduce random error due to uncontrollable factors that may have impacted the dependent variables measured in the study (unintended effects, ad evaluation, and behaviour intention) a randomized pre-post trial was used. The use of a randomized pre-post trial is intended to control for weight attitudes and other variables that may differ across participants at baseline; such as, current and previous body weight (Kaiser Family Foundation, 2004), former exposure to body standards in the media (Kaiser Family Foundation, 2004), current body-image concerns (Kaiser Family Foundation, 2004), former dieting practices (Story, Neumark-Sztainer, & French, 2002), and disordered eating history (Fleming & Towey, 2003). Such a design is also intended to control for self-esteem and negative mood variables; such as, current self-esteem (Goodman & Whitaker, 2002, Fleming & Towey, 2003), social discrimination (Sothern, Myers, & Martin, 2004), body-image induced depression (Sothern et al., 2004), and self-efficacy for healthy eating and physical activity (Latner, 2001). Due to the number and sensitivity of the variables, it would be overly burdensome to measure them all.

A randomized pre-post trial also helps to control for ad evaluation variables; such as, previous exposure to similar ads, health education programs, or social marketing initiatives (Huhman et al., 2005; Hoeschler et al., 2002; Mixon, 2001). Variables related to change intentions; such as, current physical activity and diet (Agron et al., 2002; Sallis, 1993), pre-existing knowledge and attitudes towards healthy eating and physical activity (Agron et al., 2002), exposure to different social and physical environments (Gregson et al., 2001), ethnicity and gender variations on food and physical activity habits (Mixon, 2001; Sallis, 1993), demographic characteristics such as education, socioeconomic status, gender, and age (Kohl & Hobbs, 1998); as well as current intentions to be active and eat healthy (Sallis, 1993) are also better controlled by randomization.

Random assignment occurred twice – first when assigning participants to a testing condition, and second when assigning participants to the order in which they rated obesity prevention PSAs. These efforts were made to increase the internal validity of the current study (Swinburn et al., 2005). The use of a control condition also further increased the merit of causal inferences for the current study (Bauman et al., 2006).

Despite the efforts to control error, several variables were not uniformly distributed at baseline. These variables included: weekly screen time, gender, self-perceived health, and stages of change. Uneven distribution of such variables may have had an impact on the findings in the current study. For instance, those with high rates of weekly screen time may have also been exposed to more advertising influences, and thus less receptive towards messages promoting healthy foods (Kaiser Family Foundation, 2007). In the case of gender, body-image and health conditions did not have equivalent representation: males in the body-image condition were over represented while females in the health condition were over represented. Thus, any significant gender effects found in either body-image or health PSA conditions may have been a result of uneven gender representation. These issues could have been addressed by using either all males or females for the current study or larger sample numbers from each gender as well as randomizing gender using a stratified procedure to ensure balance. For both self-perceived health and stages of change variables, those having higher measures on either scale at baseline may have also affected study results. Slater and Tiggemann (2006) argued that females who indicate high levels of activity also display higher levels of body dissatisfaction and drive for thinness and thus may be more receptive to body-image messages. However, given the very early stage of research on unintended effects of obesity prevention PSAs and feasibility constraints, the decision was made to include both genders. The findings can inform future studies that can be both larger and more focused to further elucidate these phenomena.

Systematic Error.

Systematic error results from factors which may effect measurement of a variable across the sample (Kerlinger & Lee, 2000). Several mechanisms were used to reduce systematic error in the current study. First, pre-test research allowed instruments to be modified to increase comprehension among adolescents prior to the main experiment, while focus groups allowed the appropriate obesity prevention PSAs to be selected that would appeal to an adolescent population and validated their groupings.

Each instrument used in the main experiment was also selected only after thorough examination of its psychometric properties and ability to meet measurement objectives. For example, because only very short term effects were being measured, instruments were selected which were designed to measure state vs. trait phenomena. Second, all PSAs were kept as similar as possible (aside from their theoretical grouping) by holding a set of conditions constant for each PSA (e.g., colour ads, real images, minimal text, 8½ x 11 letter size, balance of gender by category, balance of behaviour promotion by category, visuals told a story, spoke to a adolescent audience, and images of different body types).

However, it must be acknowledged that no experimental design of real-life PSAs can be perfect and PSAs may not have been entirely homogeneous within groups. Some groups (e.g., non-health focused PSAs) contained more physical activity messages than nutrition ones. Likewise, since the PSAs were from a variety of organizations around the world (United States, Australia, the United Kingdom, and Canada) some materials may not have been as relevant to North American adolescents. As well, four different health-related behaviours were present in the control group in comparison to the two behaviours present in all other PSAs: healthy eating and active living generally. Thus, effects found for control PSA may have been due to this systematic error. It would have also been a stronger design had the control PSAs been incorporated in focus testing. Experimental ads could have been created that perfectly balanced and controlled these features; however, that approach would represent efficacy research rather than effectiveness research which was the intended approach in this work. Several weaknesses may have existed with the instruments used. For instance, the AAWAD scale (Crandall, 1994) may have been worded too negatively. Likewise, since high pre measures for behaviour intention existed (both physical activity and healthy eating) it is possible that a *ceiling effect* (Cohen, 1995) may have occurred: no room for the pre scores to move significantly higher during post administration. This may explain why less significant physical activity intentions existed in the study between pre and post administration.

The strength of controlled experiments is the virtue of high internal validity but they also have the liability of low external validity (Bernard, 1999). It can often be difficult to draw assumptions about whether the same results that occur in an experimental setting will occur in a real-world setting. Although the pre-post questionnaires were administered in small group settings, both presence of peers and test anxiety (Hembree, 1988; Stycos, 1981) may have impacted the internal validity of the results.

It can be difficult to measure and draw conclusions about behaviour change as a result of an intervention, particularly if the intervention only occurred for a short period of time (Peterson, Abraham, & Waterfield, 2005). For the current research, behaviour intention was measured instead of actual behaviour change since participants were exposed to obesity prevention PSAs only over a short period of time and feasibility of observing and recording subsequent behaviour change was limited.

According to Trochim (2006) the best way to control for systematic error is by using multiple measures of the same construct. In the current case, a mixed methods approach was used to triangulate across measures to learn about the impact of obesity prevention PSAs on adolescents.

Implications

Formative Research

This research exemplifies the vital role that formative research plays in planning and implementing a social marketing campaign (Young et al., 2004). Indeed, through the use of both qualitative and quantitative methods, ineffective social marketing approaches can be eliminated, and both media and message preferences of the target audience can be established (Tucker & Irwin, 2005; Young et al., 2004). This study also shows how exploratory, pre-test, focus group and survey research can all be conducted on a limited budget (Kerlinger & Lee, 2000) and thus should not limit individuals or organizations from carrying out such steps prior to campaign implementation.

Triangulation

This research also exemplifies that a mixed methods design can be particularly effective in triangulating theories across research designs. Collins, Curley, Clay, and Lara (2005) discussed the strengths of using triangulation; such as, being able to collect data from different sources and using several different qualitative and quantitative methods. In this study, social marketing print advertisements from a variety of sources were gathered and both quantitative and qualitative methods were used. The results illustrate how the use of a mixed methods design allowed for strong themes to emerge from data. By combining different research methods, rich data can be obtained and similar patterns drawn from qualitative and quantitative results.

For qualitative research, rich information was gathered about adolescent reactions towards obesity prevention PSAs. In the case of the randomized pre-post model of effect, inferences were made where immediate responses occurred with exposure to PSAs and there was no viable alternative explanation for the observed change (Doner, 2003). Overall, when both qualitative and quantitative research methods are considered, the following commonalities may serve as implications for future adolescent obesity prevention efforts using print-based PSAs:

1. Body-image PSAs may not be the most appropriate way to prevent adolescent obesity as exposure may generate anxiety in adolescent populations;
2. Obesity prevention health PSAs seem to be well liked among adolescent audiences, particularly those that are well designed. As well, adolescents may prefer PSAs that communicate current statistics or immediate health information in comparison to PSAs that communicate long term health effects of undesired behavior;
3. Adolescents are favorable towards obesity prevention PSAs that focus on specific salient behaviors in comparison to those that communicate less-relevant health behaviours;
4. Adolescents are marketing savvy and particularly favorable towards obesity prevention PSAs that are well designed and professional with the following aesthetic characteristics: simple, realistic, colourful visuals; minimal text alongside the visual; white backgrounds; and realistic pictures;
5. Obesity prevention PSAs may induce increases in healthy eating intentions; and,
6. Young men and women process obesity prevention PSAs differently: body-image PSAs may generate less negative weight attitudes among young men, whereas young women may attend more to health PSAs because of their salience, while young men may have better attitudes towards non-health PSAs. Overall, young men are also more likely to indicate behavior intentions following PSA exposure in an experimental setting.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Very few Canadian studies have examined how social marketing strategies can be applied to obesity prevention (Tucker & Irwin, 2005). As well, little research exists examining the effectiveness of social marketing in adolescent populations (Thackeray et al., 2002). The current study provides some specific findings to inform research and practice in this field. This research also sheds light into the relationship between obesity-specific messages aimed at adolescents and adverse effects, behaviour intention and advertisement evaluation.

Although few studies have examined social marketing strategies related to obesity, the original efforts taken to gather obesity prevention PSAs demonstrate that researchers and organizations around the world are making strong efforts to use mass media to prevent and reduce adolescent obesity. Moreover, with the advent of a powerful means of communication - the internet, researchers and practitioners can coordinate with one another to share ideas and campaign materials in an effort to make a difference in this complex issue faced by society.

Recommendations for Further Research

Several recommendations can be made for future research. To further study the role of unintended effects and body-image obesity prevention PSAs, it would be interesting to study male and female adolescents separately. It would be fascinating to specifically design body-image PSAs geared towards each gender. In the case of women, body parts could be incorporated in the PSA visuals, while facial structure could be incorporated for men. This would allow for further examination about the concept of body-image among men and women and determine if exposure to obesity prevention PSAs designed in such a manner has negative effects (Silberstein et al., 1988).

To test whether the social comparison theory plays a role in unintended effects, and the relationship between upward and downward comparisons among body-image obesity prevention PSAs, research with slender as well as overweight or obese female participants is warranted. Such research would determine if exposure to overweight or obese images causes unintended effects among heavy individuals and if exposure to idealized images causes unintended effects among slender women. Since anxiety changes were found in the current study, future research could expand on that of Haines and Neumark-Sztainer (2006) to examine if media exposure to overweight images causes internalization of the thin-ideal or changes in attitudes toward weight.

It would also be interesting to specifically look at whether individuals with low appearance self-esteem are more likely to suffer from unintended effects following exposure to body-image focused communication messages in comparison to individuals with high appearance self-esteem. If a relationship was found, it would support the argument provided by O'Dea's (2005), that obesity prevention mass communication efforts which incorporate body-image focused communication messages may suffer from boomerang effects, such as poor self-esteem among adolescents of normal weights that perceive themselves to be fat.

Likewise, it would also be interesting to study the psychological theory of reactance (Brehm, 1966) in context with boomerang effects and body-image PSAs. Since anxiety was found in the current study among adolescents, it would be interesting to measure direct behaviours, such as unhealthy eating following exposure to body-image obesity prevention PSAs. If participants are significantly more likely to eat unhealthy food following exposure to obesity prevention PSAs, this would suggest that body-image PSAs may increase unhealthy behaviours, such as binge eating.

Future research geared towards obesity prevention promotional materials aimed at adolescents and the use of such strategies in real-world settings, such as high schools, are also warranted. Efforts to recruit adolescents for the study from the general community may produce a sample which can be more broadly generalized. Such research could also expose the adolescent target audience to communication efforts over a longer period of time as the exposure used in the current design may not have been strong enough. Likewise, future research could incorporate direct measures of behaviour change taken before and after such exposure. The use of a marketing organization, such as an advertising agency, in the design of professional looking PSAs based on theoretical groupings (body-image, health, non-health, and control) would allow for differences across campaigns to be controlled for.

The finding that anxiety was induced following body-image PSA exposure, suggests that researchers should be cognizant of the potential for unintended effects and consider them in testing. Further research on the type of media exposure that adolescents are exposed to regarding the obesity epidemic is warranted. By understanding the exposure levels, researchers may be able to design campaigns that have a stronger impact on the healthy eating and active living behaviours or intentions of adolescents.

Last, a subject of particular interest and relevance is the study of emerging technologies and how this plays a role in the prevention and reduction of adolescent obesity (Stice et al., 2006). For instance, traditional mass communication channels (e.g., billboards, print, television and radio) are becoming obsolete in the new media world of internet, mobile phones and other wireless communications devices (Bauman et al., 2006). Most recently, the growth of *social media* on the internet has been rapid, particularly among adolescents. Defined as places where social networks are not bounded by geographical constraints, the implications of social media in harnessing public health change should be considered.

Recommendations for Practice

Possible anxiety changes found in this study among adolescents following body-image PSA exposure support the necessity for a multi-disciplinary team in the planning of obesity prevention campaigns – experts from obesity and eating disorders alike. Such a team should also include marketing experts, such as advertising executives or creative directors, as can be supported by the success of several stylistically appealing PSAs in this study. Significant gender differences in this research suggest the need for gender specific strategies, or at least the consideration of gender-related responses, when designing obesity prevention campaigns for adolescent obesity.

This research does not aspire to make the argument that print advertising aimed at adolescent obesity is, by itself, effective in solving the obesity problem in developed countries. Instead, a multi-component intervention based in social marketing principles, environmental changes, and policy decisions may potentially be more effective in offering solutions to the obesity epidemic (Thakeray et al., 2002). Examples can be taken from key world leaders, such as Great Britain, who have undertaken environmental and policy-related changes in conjunction with social marketing to fight the obesity epidemic, for instance by recently banning PSAs for unhealthy foods aimed at children under 16 years of age (Kaiser Family Foundation, 2007).

The current research also demonstrates the importance in practice of conducting formative research based on sound behavioral change theory (Bauman et al., 2006). By taking steps such as the ones outlined (e.g., exploratory and focus group research), campaign planners can better develop effective messages that appeal to niche and specific audiences, in this case adolescents (Bauman et al., 2006).

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APPENDIX A:
THESIS DESCRIPTION

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5-10 University Extension Centre
8303-112 Street
Edmonton, Alberta
T6G 2T4
Phone: (780) 492-4039
Fax: (780) 492-9579
Email: jdooley@ualberta.ca

OVERVIEW OF GRADUATE RESEARCH THESIS

Research Project Title: Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity

Investigator: Jennifer Dooley

Thesis Supervisors: Dr. Carol Adair and Dr. Sameer Desphande

This study will examine the immediate effects of public service ads (PSA) from social marketing campaigns that are intended to prevent adolescent obesity. Effects examined include possible positive (ad evaluation, stated intention to change nutrition or physical activity behavior) and negative effects (weight attitudes, mood and self-esteem). The findings are intended to help inform the design of future multi-disciplinary interventions that incorporate a social marketing approach for obesity prevention and reduction among adolescent populations.

The first phase of the research, now completed, involved gathering and grouping obesity-relevant print advertisements aimed at adolescents.

The next phases will involve a mixed methods approach to test the PSAs with adolescents aged 12 to 18 years. The *second* phase will involve two focus groups (one each for five to seven females and males) to discuss the strengths, weaknesses and groupings of the PSAs. The focus groups will take about 90 minutes.

In the *third* phase we will pre-test survey instruments, using one-on-one cognitive interviews with five adolescents. Each interview will last for approximately 60 minutes.

The *fourth* phase is the main experiment. In this part we will randomize approximately 100 adolescents to four PSA categories (a) body-image focused, (b) health message focused, (c) non-health message focused, and (d) unrelated (control condition). The adolescents will complete questionnaires before and after viewing PSAs. The main experiment will take approximately 90 minutes.

Questionnaires that will be used include: the Attitudes about Weight and Dieting (Crandall, 1994[1]), the State Self-Esteem Scale (Heatherton & Polivy, 1991[2]), the Multiple Affect Adjective Check List (Zuckerman & Lubin, 1965, 1985[3]), a Healthy Eating Intention Scale (Baker, Little, & Brownell, 2003[4]), a Physical Activity Intention Scale (Baker et al., 2003), the Physical Activity: Stages of Change Short Form (Prochaska, 1991[5]), a modified version of the Physical Activity: Stages of Change Short Form relevant to healthy eating, and an Ad Evaluation Scale (Kelly et al., 2006[6]).

It is predicted that body-image focused messages (the first independent variable) will be significantly more likely to induce negative weight attitudes, lower self-esteem and stimulate negative mood (dependent variables) in comparison to unrelated messages (control condition). It is also predicted that non-health focused messages (the second independent variable) will receive more positive ad evaluations and result in more change intentions (dependent variables) in comparison with health focused messages.

This research should not be interpreted as a recommendation that print advertising aimed at adolescent obesity should be used in isolation to solve the obesity problem in developed countries. Instead, a multi-component intervention based in social marketing principles, environmental changes, and policy decisions will be needed as an effective solution to the obesity epidemic. However, the current research will shed light on the effects of various types of PSAs (as one important component of a social marketing strategy).

If you have further questions concerning matters related to this research, please contact:

Jennifer Dooley Phone (403) 614-4091

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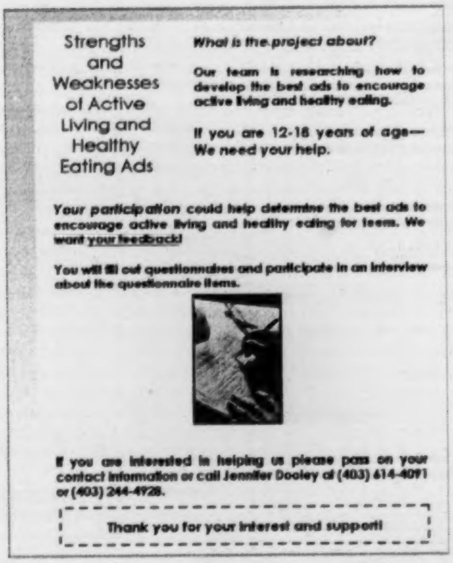
APPENDIX B:
ADOLESCENT RECRUITMENT SLIPS AND POSTERS

PRE-TEST RECRUITMENT SLIP



Strengths
and
Weaknesses
of Active
Living and
Healthy
Eating Ads

What is the project about?

Our team is researching how to develop the best ads to encourage active living and healthy eating.

**If you are 12-18 years of age—
We need your help.**

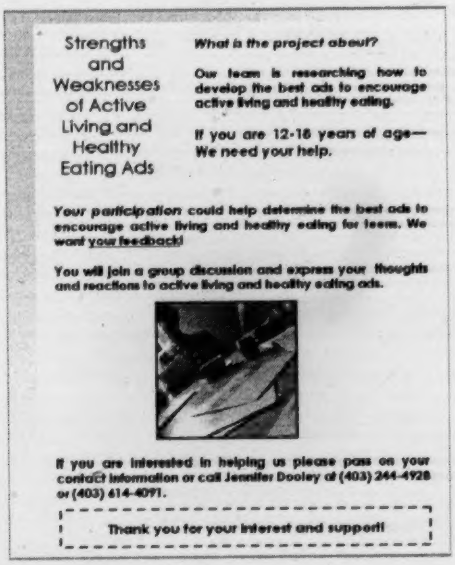
Your participation **could help determine the best ads to encourage active living and healthy eating for teens. We want your feedback!**

You will fill out questionnaires and participate in an interview about the questionnaire items.

If you are interested in helping us please pass on your contact information or call Jennifer Dooley at (403) 614-4091 or (403) 244-4928.

Thank you for your interest and support!

FOCUS GROUP RECRUIT SLIP



Strengths
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What is the project about?

Our team is researching how to develop the best ads to encourage active living and healthy eating.

**If you are 12-18 years of age—
We need your help.**

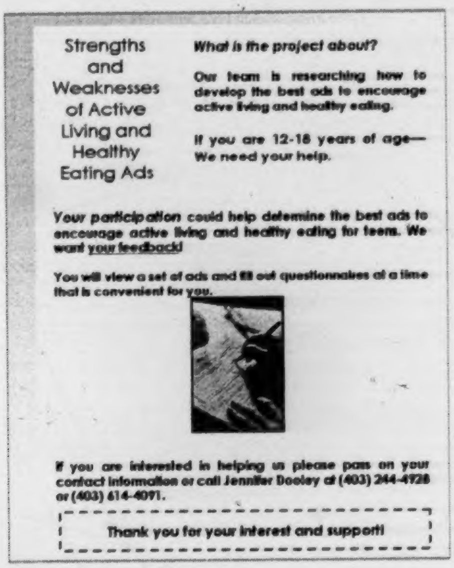
Your participation **could help determine the best ads to encourage active living and healthy eating for teens. We want your feedback!**

You will join a group discussion and express your thoughts and reactions to active living and healthy eating ads.

If you are interested in helping us please pass on your contact information or call Jennifer Dooley at (403) 244-4928 or (403) 614-4091.

Thank you for your interest and support!

ADVERTISEMENT TESTING RECRUITMENT SLIP



Strengths
and
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Living and
Healthy
Eating Ads

What is the project about?

Our team is researching how to develop the best ads to encourage active living and healthy eating.

**If you are 12-18 years of age—
We need your help.**

Your participation **could help determine the best ads to encourage active living and healthy eating for teens. We want your feedback!**

You will view a set of ads and fill out questionnaires at a time that is convenient for you.

If you are interested in helping us please pass on your contact information or call Jennifer Dooley at (403) 244-4928 or (403) 614-4091.

Thank you for your interest and support!

PRE-TEST RECRUITMENT POSTER

Strengths and Weaknesses of Active Living and Healthy Eating Ads

Our team is researching how to develop the best ads to encourage active living and health eating.

If you are 12-18 years of age—We need your help.

Your participation could help determine the best ads to encourage active living and healthy eating for teens. We want ***your feedback!***

What would you be doing?

You will:

- Fill out questionnaires and participate in an 60 minute interview about the questionnaire items.

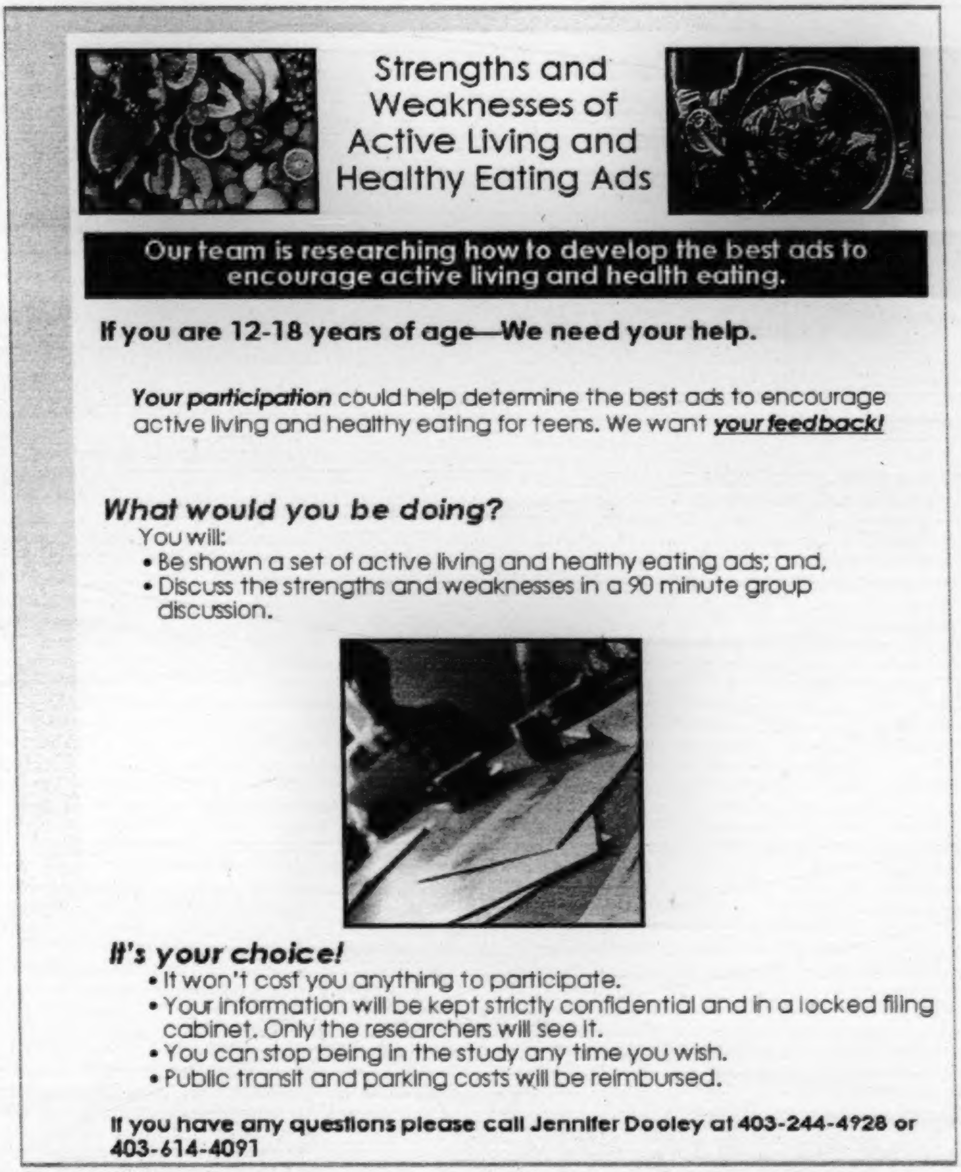
It's your choice!

- It won't cost you anything to participate.
- Your information will be kept strictly confidential and in a locked filing cabinet. Only the researchers will see it.
- You can refuse to complete any of the questions or stop being in the study any time you wish.
- Public transit and parking costs will be reimbursed.

If you have any questions please call Jennifer Dooley at 403-614-4091

Who are we?
The study team includes Jennifer Dooley (Master's student at the Centre for Health Promotion Studies, University of Alberta), Dr. Carol Adair (Thesis Supervisor and Associate Professor with the Department of Psychiatry and the Department of Community Health Sciences , University of Calgary) and Dr. Sameer Deshpande (Assistant Professor of Marketing Faculty of Management, University of Lethbridge).

FOCUS GROUP RECRUITMENT POSTER



Strengths and Weaknesses of Active Living and Healthy Eating Ads

Our team is researching how to develop the best ads to encourage active living and health eating.

If you are 12-18 years of age—We need your help.

Your participation could help determine the best ads to encourage active living and healthy eating for teens. We want ***your feedback!***

What would you be doing?

You will:

- Be shown a set of active living and healthy eating ads; and,
- Discuss the strengths and weaknesses in a 90 minute group discussion.

It's your choice!

- It won't cost you anything to participate.
- Your information will be kept strictly confidential and in a locked filing cabinet. Only the researchers will see it.
- You can stop being in the study any time you wish.
- Public transit and parking costs will be reimbursed.

If you have any questions please call Jennifer Dooley at 403-244-4928 or 403-614-4091

Who are we?

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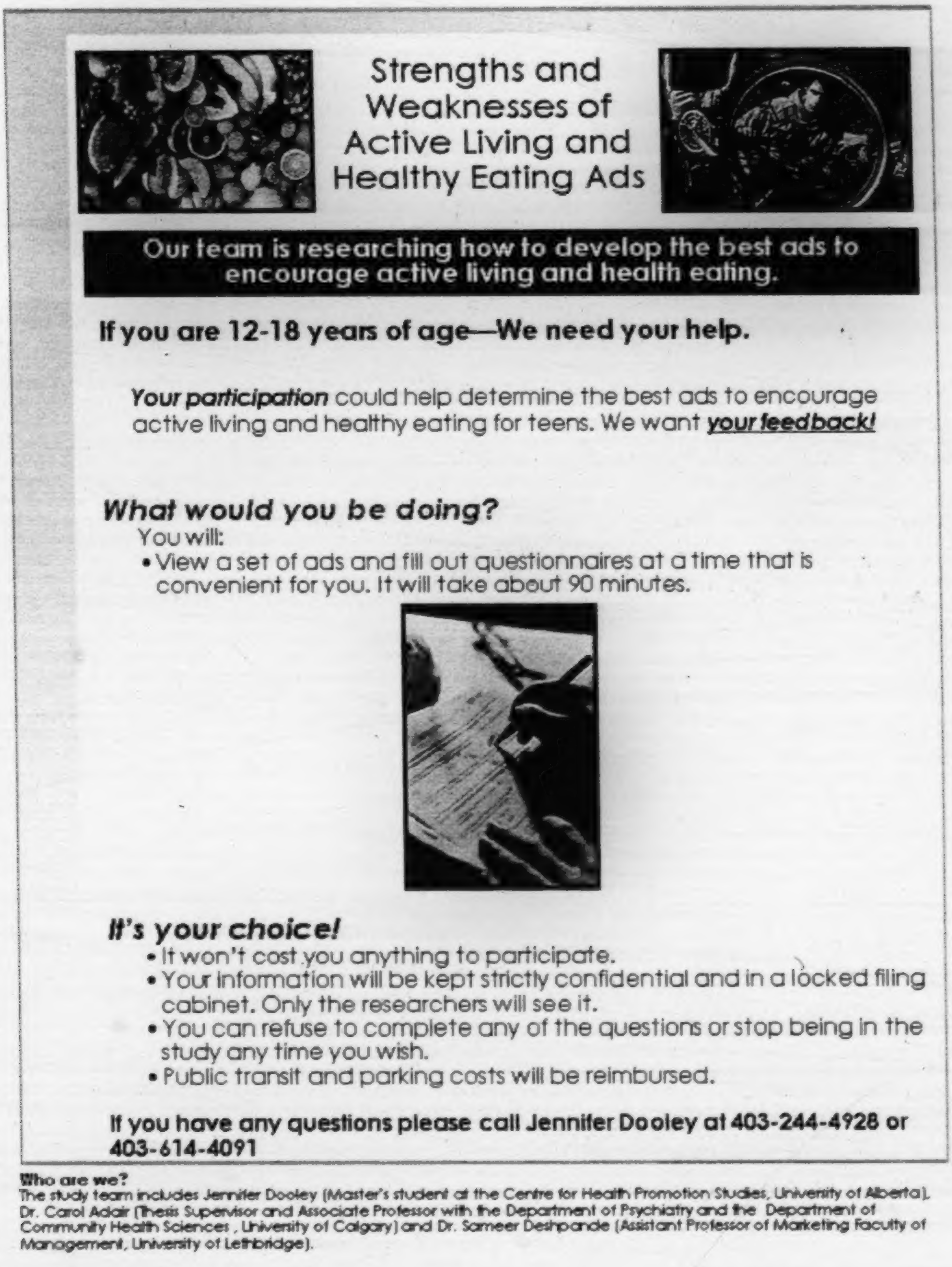
ADVERTISEMENT TESTING RECRUITMENT POSTER



Strengths and Weaknesses of Active Living and Healthy Eating Ads

Our team is researching how to develop the best ads to encourage active living and health eating.

If you are 12-18 years of age—We need your help.

Your participation could help determine the best ads to encourage active living and healthy eating for teens. We want ***your feedback!***

What would you be doing?

You will:

- View a set of ads and fill out questionnaires at a time that is convenient for you. It will take about 90 minutes.

It's your choice!

- It won't cost you anything to participate.
- Your information will be kept strictly confidential and in a locked filing cabinet. Only the researchers will see it.
- You can refuse to complete any of the questions or stop being in the study any time you wish.
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APPENDIX C:
TELEPHONE RECRUITMENT SCRIPT

A. Introduction
Hello, may I please speak to **[INSERT CONTACT NAME]**?
[IF CONTACT IS TEEN READ A1, IF CONTACT IS PARENT, READ A2]

A1. Adolescent Introduction
My name is Jennifer Dooley and I am a Master's student in Health Promotion Studies at the University of Alberta. You expressed interest in participating in a research project about active living and healthy eating ads. I'm calling to schedule this research with you and obtain consent for your participation. Are you younger than 14 years of age?
[IF NO, PROCEED TO B2. IF YES ASK TO SPEAK WITH PARENT/GUARDIAN AND PROCEED TO A2].

A2. Parent/Guardian Introduction
My name is Jennifer Dooley and I am a Master's student in Health Promotion Studies at the University of Alberta. You or your son/daughter responded expressed interest in participating in a research project about active living and healthy eating ads. The purpose of this call is to describe the research project, obtain verbal consent from you for your adolescent to participate, and schedule a date and time to conduct the research. **[CONTINUE TO B1].**

B1. Parent/Guardian Project Description
The purpose of this project is to examine how advertisements can be used to encourage active living and healthy eating. If you and he/she agree to take part he/she will view a set of ads and fill out questionnaires that measure a variety of psychological responses to advertisements. The identity of the participants will be kept confidential. He/she can refuse to answer any of the questions, or stop taking part at any time if he/she wishes. Your adolescent is under no obligation to take part. General study results will be made available to you should you indicate that you wish to receive them.
[CONTINUE TO C].

B1. Adolescent Project Description (14 years of age and above)
The purpose of this project is to examine how advertisements can be used to encourage active living and healthy eating. If you agree to take part, you will view a set of ads and fill out questionnaires that measure a variety of psychological responses to advertisements. Your identity will be kept confidential and you can refuse to answer any of the questions, or stop taking part at any time. You are under no obligation to take part. General study results will be made available to you should you indicate that you wish to receive them.
[CONTINUE TO C].

C. Verbal Agreement

Your agreement indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to attend/allow your adolescent to attend the research session. Do you have any questions about the study that you need answered?

[CONTINUE TO D].

D. Scheduling

Here are some potential dates when the research can take place

[READ DATES, ONCE A DATE HAS BEEN FINALIZED, PROVIDE THE ADDRESS. CONTINUE TO E].

E. Consent Forms

Informed consent is required in writing by subjects 14 years of age and above or parent/guardians with adolescents under 14. Parent/guardians with adolescents under 14 years of age can accompany their child, such that any further questions can be answered and consent forms can be signed before the research session begins. Alternatively, the consent form can be sent with a postage paid envelope to allow return by mail. However, your adolescent can only participate in this research if the consent form has been received by the researcher. Would you prefer to sign the consent form in person of would you like the form mailed to you?

[OBTAIN ADDRESS IF MAILING IS PREFERED. CONTINUE TO F].

F. Public Transit and Parking Costs

Please not that public transit or parking costs will be reimbursed.

APPENDIX D:
CAMPAIGN DETAILS

OBESITY-RELEVANT CAMPAIGN DETAILS

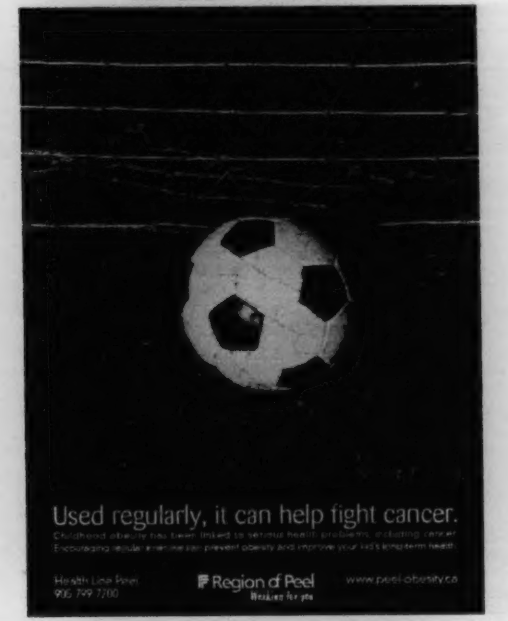
Campaign	Funders	Place	Primary Target	Secondary Target
Stop Childhood Obesity Now	Peel Public Health	Peel Region, ON: Canada	Children, adolescents, and adults	
California Project LEAN - Food On The RUN	California Department of Health Services and the Public Health Institute	California, 28 low-income high schools in 20 counties, U.S.	Adolescents: low-income, early adopters (diffusion of innovations category)	Parents, community members and local policy makers
Go For 2 & 5 Veg Campaign	Australian Government	Communities throughout Australia	Parents/care givers of children and youth aged 0-17	Children aged 5-12 and adolescents aged 13-17
Small Steps	Ad Council and U.S. Department of Health & Human Services	Communities throughout the U.S.	Children, adolescents, and adults	
Eat Smart. Play Hard™	U.S. Department of Agriculture Food and Nutrition Service	Communities throughout the U.S.	Children, adolescents, and adults	
Get Active	United Way of Massachusetts Bay	Massachusetts Bay, U.S.	Adolescents 13-16 years	Adult influencers
Do What Moves You: Verb	Centers for Disease Control and Prevention (CDC)	Communities throughout the U.S.	Tweens 9-13 years	Parents and adult influencers, including teachers, youth leaders, physical education and health professionals, pediatricians, health care providers, coaches, etc
Fight Obesity	International Diabetes Federation and the World Health Organization	Worldwide	All ages	
Snack Yourself Silly	Nechi Training, Research, and Health Promotion Institute	St. Albert, AB: Canada	All ages	
Scotland Healthy Living	Scottish Executive – NHS Health Scotland	Scotland, U.K.	All ages	

CONTROL CONDITION CAMPAIGN DETAILS

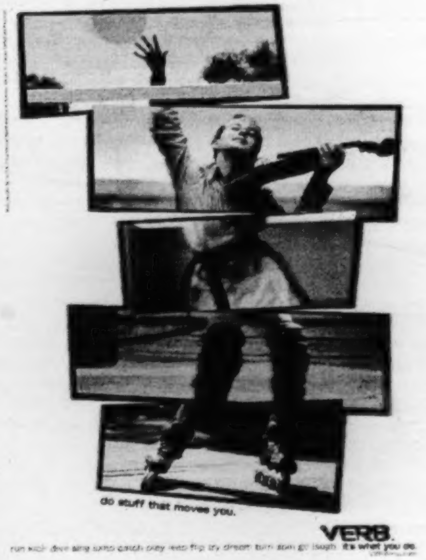
Campaign	Funders	Place	Primary Target	Secondary Target
Choose Your Cover	Centers for Disease Control and Prevention (CDC).	Communities throughout the U.S.	Adolescents	
Clean Hands Saves Lives	Clinical Excellence Commission	Sydney, Australia	Generic	
Adolescent Volunteerism	Ad Council, National Crime Prevention Council (NCPC), U.S. Department of Justice and USA Freedom Corps	Communities throughout the U.S.	Adolescents	
Buckle Up – Even in the Back Seat	Unknown	North America: U.S. and Canada.	Adolescents	
Let's Work Together For Safety: Hand Washing	Washington State Hospital Association	Washington, DC	Generic	

APPENDIX E:
ADVERTISEMENT CATEGORY EXAMPLES

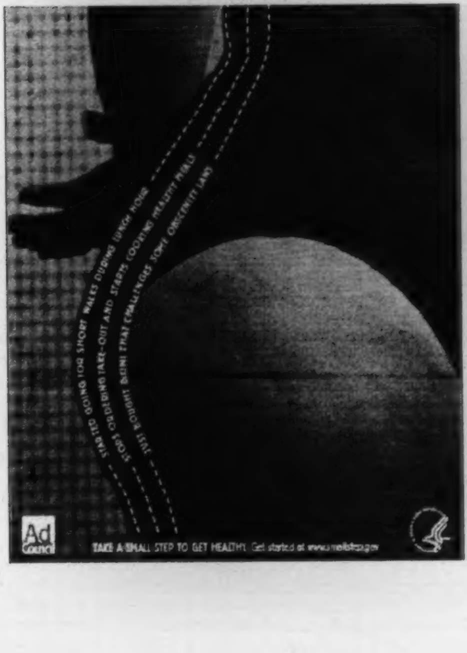
HEALTH FOCUSED
STOP CHILDHOOD OBESITY NOW
REGION OF PEEL


Used regularly, it can help fight cancer.
Childhood obesity has been linked to serious health problems, including cancer.
Encouraging regular exercise can prevent obesity and improve your kid's long-term health.
Health Line Peel
905 799 7700
Region of Peel
Working for you
www.peel-obesity.ca

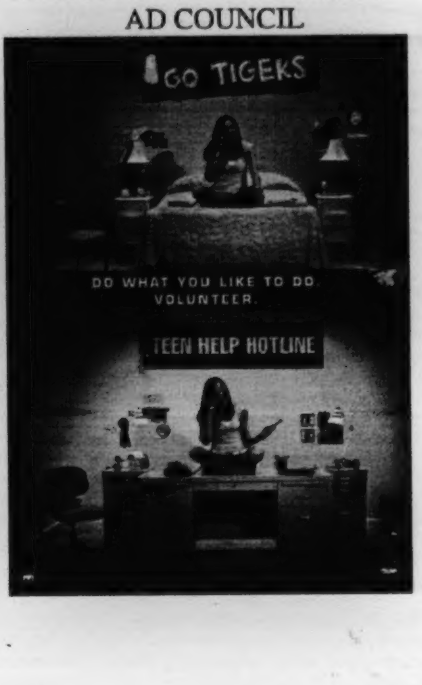
NON-HEALTH FOCUSED
DO WHAT MOVES YOU
CDC VERB


do stuff that moves you.
VERB.
it's what you do.

BODY-IMAGE FOCUSED
SMALL STEPS CAMPAIGN
AD COUNCIL


STARTED GOING FOR SHORT WALKS DURING LUNCH HOUR
STOPS ORDERING TAKE-OUT AND STARTS COOKING HEALTHY MEALS
JUST BOUGHT BIKINI THAT CHALLENGES SOME OBSCENITY LAWS
Ad Council
TAKE A SMALL STEP TO GET HEALTHY. Get started at www.smallstep.gov

CONTROL CONDITION
ADOLESCENT VOLUNTEERISM
AD COUNCIL


GO TIGERS
DO WHAT YOU LIKE TO DO.
VOLUNTEER.
TEEN HELP HOTLINE

APPENDIX F[7]:
CURRENT THOUGHTS SCALE: THE STATE SELF-ESTEEM SCALE

INSTRUCTIONS: *This is a questionnaire designed to measure what you are thinking at this moment. There is, of course, no right answer for any statement. The best answer is what you feel is true of yourself at this moment. Be sure to answer all of the items, even if you are not certain of the best answer. Again, answer these questions as they are true for you RIGHT NOW.*

Using the following scale, place a number in the box to the right of the statement that indicates what is true for you at this moment:
1 = not at all
2 = a little bit
3 = somewhat
4 = very much
5 = extremely

1.	I feel confident about my abilities.	☐	P
2.*	I am worried about whether I am regarded as a success or failure.	☐	S
3.	I feel satisfied with the way my body looks right now.	☐	A
4.*	I feel frustrated or rattled about my performance.	☐	P
5.*	I feel that I am having trouble understanding things that I read.	☐	P
6.	I feel that others respect and admire me.	☐	A
7.*	I am dissatisfied with my weight.	☐	A
8.*	I feel self-conscious.	☐	S
9.	I feel as smart as others.	☐	P
10.*	I feel displeased with myself.	☐	S
11.	I feel good about myself.	☐	A
12.	I am pleased with my appearance right now.	☐	A
13.*	I am worried about what other people think of me.	☐	S
14.	I feel confident that I understand things.	☐	P
15.*	I feel inferior to others at this moment.	☐	S
16.*	I feel unattractive.	☐	A
17.*	I feel concerned about the impression I am making.	☐	S
18.*	I feel that I have less scholastic (school) ability right now than others.	☐	P
19.*	I feel like I'm not doing well.	☐	P
20.*	I am worried about looking foolish.	☐	S

SCORING: Responses indicating the most extreme in terms of high self-esteem earn 5, those with the least extreme in high self-esteem earn 1. Scores can range from a minimum of 20 for low self-esteem, to a maximum of 100 for high self-esteem. Statements with an asterisk are reversed-keyed items. The letter in the last column indicates the primary factor on which that item loaded in a factor analysis: performance self-esteem (P), social self-esteem (S), and appearance self-esteem (A). Four scales exist: performance self-esteem, social self-esteem, appearance self-esteem, and overall state self-esteem (the combination of all three).

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[7] Adapted and modified from "Development and validation of a scale for measuring state self-esteem" by T.F. Heatherton, & J Polivy, 1991, In *Journal of Personality and Social Psychology, 60*, 895-910.

APPENDIX G[8]:
MULTIPLE AFFECTIVE ADJECTIVE CHECK LIST

INSTRUCTIONS: *On this sheet you will find words which describe different kinds of moods. Blacken in the circles beside words which describe how you feel now – today. Some words may sound alike, but we want you to check all the words that describe your feelings. Work rapidly.*

1. ○ active (-D)
2. ○ adventurous
3. ○ affectionate
4. ○ afraid (+A)
5. ○ agitated
6. ○ agreeable (-H)
7. ○ aggressive
8. ○ alive (-D)
9. ○ alone (+D)
10. ○ amiable (nice) (-H)
11. ○ amused
12. ○ angry (+H)
13. ○ annoyed
14. ○ awful (+D)
15. ○ bashful
16. ○ bitter (+H)
17. ○ blue (+D)
18. ○ bored
19. ○ calm (-A)
20. ○ cautious
21. ○ cheerful (-A)
22. ○ clean (-D)
23. ○ complaining
24. ○ contented (-A)
25. ○ contrary
26. ○ cool
27. ○ cooperative (-H)
28. ○ critical
29. ○ cross
30. ○ cruel (+H)
31. ○ daring
32. ○ desperate (+A)
33. ○ destroyed (hurt) (+D)
34. ○ devoted (-H)
35. ○ disagreeable (+H)
36. ○ discontented (+H)
37. ○ discouraged (+D)
38. ○ disgusted (+H)
39. ○ displeased
40. ○ energetic
41. ○ enraged (+H)
42. ○ enthusiastic (-D)
43. ○ fearful (+A)
44. ○ fine (-D)
45. ○ fit (-D)
46. ○ forlorn (depressed) (+D)
47. ○ frank
48. ○ free (-D)
49. ○ friendly (-H)
50. ○ frightened (+A)
51. ○ furious (+H)
52. ○ lively (-D)
53. ○ gentle
54. ○ glad (-D)
55. ○ gloomy (+D)
56. ○ good (-D)
57. ○ good-natured (-H)
58. ○ grim
59. ○ happy (-A)
60. ○ healthy (-D)
61. ○ hopeless (+D)
62. ○ hostile
63. ○ impatient
64. ○ incensed
65. ○ indignant
66. ○ inspired (-D)
67. ○ interested (-D)
68. ○ irritated (+H)
69. ○ jealous
70. ○ joyful (-A)
71. ○ kindly (-H)
72. ○ lonely (+D)
73. ○ lost (+D)
74. ○ loving (-A)
75. ○ low (+D)
76. ○ lucky (-D)
77. ○ mad (+H)
78. ○ mean (+H)
79. ○ meek (subdued)
80. ○ merry (-D)
81. ○ mild
82. ○ miserable (+D)
83. ○ nervous (+A)
84. ○ obliging
85. ○ offended (+H)
86. ○ outraged (+H)
87. ○ panicky (+A)
88. ○ patient
89. ○ peaceful (-D)
90. ○ pleased
91. ○ pleasant (-A)
92. ○ polite (-H)
93. ○ powerful
94. ○ quiet
95. ○ reckless
96. ○ rejected (+D)
97. ○ rough
98. ○ sad (+D)
99. ○ safe (-D)
100. ○ satisfied
101. ○ secure (-A)
102. ○ shaky (+A)
103. ○ shy
104. ○ soothed
105. ○ steady (-A)
106. ○ stubborn
107. ○ stormy (+H)
108. ○ strong (-D)
109. ○ suffering (+D)
110. ○ sullen (sulky)
111. ○ sunk (down) (+D)
112. ○ sympathetic (-H)
113. ○ tame (-H)
114. ○ tender (-H)
115. ○ tense (+A)
116. ○ terrible (+D)
117. ○ terrified (+A)
118. ○ thoughtful (-A)
119. ○ timid
120. ○ tormented (+D)
121. ○ understanding (-H)
122. ○ unhappy (+D)
123. ○ unsociable (+H)
124. ○ upset (+A)
125. ○ vexed (aggravated) (+H)
126. ○ warm (-H)
127. ○ whole (-D)
128. ○ wild
129. ○ willful (-H)
130. ○ wilted (limp) (+D)
131. ○ worrying (+A)
132. ○ young (-D)

SCORING: Words considered plus items and scored if the subject does check them, while negative items and scored if a subject does not check them. Several words are neutral and not scored. Four scales exist: anxiety, depression, hostility, and overall mood (the sum of all three). The highest maximum scores are 21 for the anxiety sub scale (indicating high anxiety), 40 for the depression sub scale (indicating high depression), 30 for the hostility sub scale (indicating high hostility), and 91 for overall mood.

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[8] Adapted and modified from *Manual for the Multiple Affect Adjective Check List* by M. Zuckerman & B. Lubin, 1965, San Diego, CA: Educational and Industrial Testing Service.

APPENDIX H[9]:
ATTITUDES ABOUT WEIGHT AND DIETING

INSTRUCTIONS: *For the following questions, circle a number between 0 and 9 to indicate how much you agree or disagree with each of the following statements.*

Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

1. I worry about becoming fat.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

2. I feel disgusted with myself when I gain weight.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

3. One of the worst things that could happen to me would be if I gained 25 pounds.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

4. Some people are fat because they have no willpower.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

5. I have a hard time taking fat people too seriously.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

6. I really don't like fat people too much.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

7. People who weigh too much could lose at least some part of their weight through a little exercise.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

8. Fat people tend to be fat pretty much through their own fault.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

9. Although some fat people are surely smart, in general, I think they tend not to be quite as bright as normal weight people.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

10. I tend to think people who are overweight are a little untrustworthy.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

11. I don't have many friends who are fat.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

12. If I were an employer looking to hire, I might avoid hiring a fat person.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

13. Fat people make me feel somewhat uncomfortable.
Strongly Disagree 0 1 2 3 4 5 6 7 8 9 Strongly Agree

SCORING: Items 5, 6, 9, 10, 11, 12, and 13 are "dislike", items 1-3 are "fear of fat", and items 4, 7, and 8 are "willpower". Each scale is scored by summing pertinent items and dividing by the number of items. Four scales exist: dislike, fear of fat, willpower, and overall mood (the sum of all three divided by all items). The highest possible score for the dislike scale is 9, fear of fat scale is 9, will power scale is 9, and overall mood is 9.

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[9] Adapted from "Prejudice against fat people: Ideology and self-interest" by C.S. Crandall, 1994, In *Journal of Personality and Social Psychology, 66,* pp. 882-894.

APPENDIX I[10]:

HEALTHY EATING INTENTION SCALE

INSTRUCTIONS: *Please read the definition below and circle a number between 1 and 6 for each item. Read each item carefully. Choose only one response per question.*

Eating healthy is eating in a balanced way with a lot of fruits and vegetables, eating three meals a day, not eating too much junk food (fast food, chips, and sweets or desserts), eating moderate amounts (not too much or too little) when you are hungry and stopping when you are full, and eating only a moderate amount of fat and sugar. Sometimes, in our current environments, it's difficult to eat healthy.

1. I plan to eat healthy over the next 2 weeks.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

2. I will try to eat healthy over the next 2 weeks.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

3. How likely is it that you will eat healthy over the next 2 weeks?

Very Unlikely 1 2 3 4 5 6 Very Likely

4. Thinking of your eating behaviour over the next 2 weeks, do you think you will participate in regular healthy eating?

Very Unlikely 1 2 3 4 5 6 Very Likely

SCORING: Eating intention is measured by adding up the score and dividing by pertinent items, with higher scores indicating higher healthy eating intention. Three scales exist: eating planning (items 1 and 2), eating expectation (items 3 and 4), and overall eating intention (the sum of everything divided by all items). The highest maximum score for eating planning is 6, eating expectation is 6, and overall eating intention is 6.

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[10] Adapted and modified from "Predicting adolescent eating and activity behaviors: The role of social norms and personal agency" by C.W. Baker, T.D. Little, & K.D. Brownell, 2003, *Health Psychology, 22,* p. 191.

PHYSICAL ACTIVITY INTENTION SCALE

INSTRUCTIONS: *Please read the definition below and circle a number between 1 and 6 for each item. Read each item carefully. Choose only one response per question.*

Being *physically active* is being involved in sports and exercising so you work up a sweat and breathe hard; choosing to be more active in everyday life, for example, taking stairs instead of an elevator; walking somewhere instead of getting a ride; choosing activities that require energy instead of choosing to watch TV or play video games during your free time; and actively participating in games or exercises in gym class at school. Sometimes, in our current environments, it's difficult to be physically active.

1. I plan to be physically active over the next 2 weeks.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

2. I will try to be physically active over the next 2 weeks.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

3. How likely is it that you will be physically active over the next 2 weeks?

Very Unlikely 1 2 3 4 5 6 Very Likely

4. Thinking of your physical activity behaviour over the next 2 weeks, do you think you will participate in regular physical activity?

Very Unlikely 1 2 3 4 5 6 Very Likely

SCORING: Physical activity intention is measured by adding up the score and dividing by pertinent items, with higher scores indicating higher physical activity intention. Three scales exist: physical activity planning (items 1 and 2), physical activity expectation (items 3 and 4), and overall physical activity intention (the sum of everything divided by all items). The highest maximum score for physical activity planning is 6, physical activity expectation is 6, and overall physical activity intention is 6.

APPENDIX J[11]:

HEALTHY EATING: STAGES OF CHANGE FORM

INSTRUCTIONS: *Please read the definition below and indicate which ONE of the statements best describes how you eat now (please place an "x" in the appropriate box). Read each item carefully. Choose only one response.*

Eating healthy is eating in a balanced way with a lot of fruits and vegetables, eating three meals a day, not eating too much junk food (fast food, chips, and sweets or desserts), eating moderate amounts (not too much or too little) when you are hungry and stopping when you are full, and eating only a moderate amount of fat and sugar. Sometimes, in our current environments, it's difficult to eat healthy.

Question:

1. Do you eat healthy according to that definition?

   ☐ Yes, I currently eat healthy regularly and have been for MORE than 6 months.
   Stage 5: Maintenance

   ☐ Yes, I currently eat healthy regularly and have been for LESS than 6 months.
   Stage 4: Action

   ☐ No, I currently do not eat healthy regularly, but I intend to in the next 30 days.
   Stage 3: Preparation

   ☐ No, I currently do not eat healthy regularly, but I intend to in the next 6 months.
   Stage 2: Contemplation

   ☐ No, I currently do not eat healthy regularly, and I do NOT intend to in the next 6 months.
   Stage 1: Precontemplation

SCORING: Respondents grouped into one of five healthy eating stages based on the item they endorse. See above for Stages.

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[11] Adapted and modified from *Exercise: Stages of Change – Short Form* by J.O. Prochaska, 1991, Kingston, RI: Cancer Prevention Research Center. Retrieved May 1, 2006, from http://www.uri.edu/research/cprc/Measures/Exercise02.htm

PHYSICAL ACTIVITY: STAGES OF CHANGE

INSTRUCTIONS: *Please read the definition below and indicate which ONE of the statements best describes how physically active you are now (please place an "x" in the appropriate box). Read each item carefully. Choose only one response.*

Being *physically active* is being involved in sports and exercising so you work up a sweat and breathe hard; choosing to be more active in everyday life, for example, taking stairs instead of an elevator; walking somewhere instead of getting a ride; choosing activities that require energy instead of choosing to watch TV or play video games during your free time; and actively participating in games or exercises in gym class at school. Sometimes, in our current environments, it's difficult to be physically active.

Question:

1. Are you physically active regularly according to that definition?

   ☐ Yes, I am currently physically active and have been for MORE than 6 months.

   Stage 5: Maintenance

   ☐ Yes, I am currently physically active and have been for LESS than 6 months.

   Stage 4: Action

   ☐ No, I currently am not physically active, but I intend to be in the next 30 days.

   Stage 3: Preparation

   ☐ No, I currently am not physically active, but I intend to be in the next 6 months.

   Stage 2: Contemplation

   ☐ No, I currently am not physically active, and I do NOT intend to be in the next 6 months.

   Stage 1: Precontemplation

SCORING: Respondents grouped into one of five post physical activity stages based on the item they endorse. See below for Stages.

APPENDIX K[12]:

AD EVALUATION SCALE

INSTRUCTIONS: *Thinking about the advertisements you see here, please mark which of the statements below best describes your feelings about the corresponding ad. Please rate one ad per page.*

1. Commercial 1:

1	2	3	4	5	6	7
It isn't cool						It's very cool
I don't like it at all						I like it a lot
My FRIENDS wouldn't like at all						My FRIENDS would like it a lot
It's not interesting/eye catching at all						It's very interesting/eye catching
I don't believe what it's saying						I believe what it's saying
It's not truthful at all						It's very truthful
It doesn't make me want to eat healthy						It makes me want to eat healthy
It doesn't make me want to exercise						It makes me want to exercise
It's hard to read						It's easy to read
It's hard to understand						It's easy to understand

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[12] Adapted and modified from "Tobacco counteradvertisements aimed at bicultural Mexican American youth" by K.J. Kelly, L.R. Stanley, M.L.G. Comello, & G.R. Gonzalez, 2006, *Journal of Health Communication, 11*, p. 463.

AD EVALUATION SCALE – *cont'd*

2. Commercial 2:

1	2	3	4	5	6	7
It isn't cool						It's very cool
1	2	3	4	5	6	7
I don't like it at all						I like it a lot
1	2	3	4	5	6	7
My FRIENDS wouldn't like at all						My FRIENDS would like it a lot
1	2	3	4	5	6	7
It's not interesting/eye catching at all						It's very interesting/eye catching
1	2	3	4	5	6	7
I don't believe what it's saying						I believe what it's saying
1	2	3	4	5	6	7
It's not truthful at all						It's very truthful
1	2	3	4	5	6	7
It doesn't make me want to eat healthy						It makes me want to eat healthy
1	2	3	4	5	6	7
It doesn't make me want to exercise						It makes me want to exercise
1	2	3	4	5	6	7
It's hard to read						It's easy to read
1	2	3	4	5	6	7
It's hard to understand						It's easy to understand

AD EVALUATION SCALE – *cont'd*

3. Commercial 3:

1	2	3	4	5	6	7
It isn't cool						It's very cool
1	2	3	4	5	6	7
I don't like it at all						I like it a lot
1	2	3	4	5	6	7
My FRIENDS wouldn't like at all						My FRIENDS would like it a lot
1	2	3	4	5	6	7
It's not interesting/eye catching at all						It's very interesting/eye catching
1	2	3	4	5	6	7
I don't believe what it's saying						I believe what it's saying
1	2	3	4	5	6	7
It's not truthful at all						It's very truthful
1	2	3	4	5	6	7
It doesn't make me want to eat healthy						It makes me want to eat healthy
1	2	3	4	5	6	7
It doesn't make me want to exercise						It makes me want to exercise
1	2	3	4	5	6	7
It's hard to read						It's easy to read
1	2	3	4	5	6	7
It's hard to understand						It's easy to understand

AD EVALUATION SCALE – *cont'd*

4. Commercial 4:

1	2	3	4	5	6	7
It isn't cool						It's very cool
1	2	3	4	5	6	7
I don't like it at all						I like it a lot
1	2	3	4	5	6	7
My FRIENDS wouldn't like at all						My FRIENDS would like it a lot
1	2	3	4	5	6	7
It's not interesting/eye catching at all						It's very interesting/eye catching
1	2	3	4	5	6	7
I don't believe what it's saying						I believe what it's saying
1	2	3	4	5	6	7
It's not truthful at all						It's very truthful
1	2	3	4	5	6	7
It doesn't make me want to eat healthy						It makes me want to eat healthy
1	2	3	4	5	6	7
It doesn't make me want to exercise						It makes me want to exercise
1	2	3	4	5	6	7
It's hard to read						It's easy to read
1	2	3	4	5	6	7
It's hard to understand						It's easy to understand

SCORING: Scored by entering pertinent items. Four scales exist for each commercial: attitude (maximum 28), believability (maximum 28), readability (maximum 14), and overall (maximum 70). After each commercial has been scored, an overall score is given for the category (e.g., Body-Image): attitude (maximum 112), believability (maximum 112), readability (maximum 56), and overall (maximum 280).

APPENDIX L[13]:
DEMOGRAPHIC QUESTIONNAIRE

INSTRUCTIONS: *Please give one answer each to the following questions. Please remember that your answers to these questions are confidential.*

1. Your Age: ________________ (years)

2. Your Gender:
   a. M
   b. F

3. Neighbourhood: __________________

4. Language most comfortable speaking and writing:
   a. English
   b. French
   c. Other (specify) ____________

5. Place of Birth:________________(city)

6. School Grade: ____________________

7. In general would you say that your health is excellent, very good, good, fair or poor?
   a. excellent
   b. very good
   c. good
   d. fair
   e. poor

8. In a typical week in the past three months, how much time did you usually spend on a computer, including playing computer games and using the Internet?"
   a. none
   b. less than an hour
   c. 1 to 2 hours
   d. 3 to 5 hours
   e. 6 to 10 hours
   f. 11 to 14 hours
   g. 15 to 20 hours
   h. more than 20 hours

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[13] Adapted and modified from "Overweight Canadian children and adolescents" by M. Shields, 2005, Ottawa, ON, *Nutrition: Findings from the Canadian Community Health Survey*, Cat. No. 82-620-MWE, Ottawa, ON: Statistics Canada. p. 11-13. Retrieved July 6, 2005 from http://www.statcan.ca/english/research/82-620-MIE/2005001/pdf/cobesity.pdf

9. In a typical week in the past three months, how much time did you usually spend playing video games, such as; Xbox (including Xbox, Xbox 360, etc.), Nintendo (including Nintendo, Nintendo 64, Nintendo GameCube, Nintendo Wii, etc.) and Playstation (including Playstation I, II, III, etc.)?
   a. none
   b. less than an hour
   c. 1 to 2 hours
   d. 3 to 5 hours
   e. 6 to 10 hours
   f. 11 to 14 hours
   g. 15 to 20 hours
   h. more than 20 hours

10. In a typical week in the past three months, how much time did you usually spend watching television or movies (including DVDs or videos)?
   a. none
   b. less than an hour
   c. 1 to 2 hours
   d. 3 to 5 hours
   e. 6 to 10 hours
   f. 11 to 14 hours
   g. 15 to 20 hours
   h. more than 20 hours

11. People living in Canada come from many different cultural and ethnic backgrounds. Are you:
   a. White
   b. Chinese
   c. South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)
   d. Black
   e. Filipino
   f. Latin American
   g. Southeast Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese, etc.)
   h. Arab
   i. West Asian (e.g., Afghan, Iranian, etc.)
   j. Japanese
   k. Korean
   l. Aboriginal Peoples of North America (North American Indian, Métis, Inuit/Eskimo)
   m. Other (specify):_______________

12. How many servings of fruits and vegetables do you usually eat each day? (a serving size for both fruits and vegetables can be considered the size of a tennis ball, small fist, or cupped hand) ____________________

13. Free Time School Physical Activity: About how many hours a week do you usually take part in physical activity (that makes you out of breath or warmer than usual) in your free time at school (for example, lunch)?
   a. never
   b. less than 1 hour per week
   c. 2 to 3 hours per week
   d. 4 to 6 hours a week
   e. 7 or more hours per week

14. Class Time Physical Activity: About how many hours a week do you usually take part in physical activity (that makes you out of breath or warmer than usual) in your class time at school?"
    a. never
    b. less than 1 hour per week
    c. 2 to 3 hours per week
    d. 4 to 6 hours a week
    e. 7 or more hours per week

15. Lessons/Leagues: About how many hours a week do you usually take part in physical activity (that makes you out of breath or warmer than usual) outside of school while participating in lessons or league or team sports?
    a. never
    b. less than 1 hour per week
    c. 2 to 3 hours per week
    d. 4 to 6 hours a week
    e. 7 or more hours per week

16. Unorganized Physical Activity: About how many hours a week do you usually take part in physical activity (that makes you out of breath or warmer than usual) outside of school while participating in unorganized activities, either on your own or with friends?
    a. never
    b. less than 1 hour per week
    c. 2 to 3 hours per week
    d. 4 to 6 hours a week
    e. 7 or more hours per week

APPENDIX M:
INSTRUMENT DESCRIPTION

Name	**Reliability/ Validity**	**Scale Standardization**	**Scoring/Marking Procedures**	**Cut-Off Scores**	**Administration Conditions/ Reading Level**
State Self-Esteem Scale (Heatherton & Polivy, 1991)	Internal reliability: - Coefficient alpha for whole scale = .92. (α = .92) when tested among 102 undergraduate Canadian men (*n*=30) and women (*n*=72). Validity: - Psychometrically sound in terms of factor structure as well as content, construct, and discriminative validity.	Total component scores when administered to 6th grade students (*N*=59): - Range = 33-100. - *M*=78.26 (*SD*=13.80).	- 20-item, 5-point Likert scale ranging from "not at all" to "extremely". - Responses indicating the most extreme in terms of high self-esteem earn 5, those with the least extreme in high self-esteem earn 1. - Scores can range from a minimum of 20 for low self-esteem, to a maximum of 100 for high self-esteem.	- Scale scores treated as continuous variables, and if necessary are categorized using scores above or below the median or quartiles.	- Originally developed with undergraduate University students. - Reading level: administered to adolescents 11 years of age.
Multiple Affect Adjective Check List (Zuckerman & Lubin, 1965, 1985).	Internal reliability: - Coefficient alpha for anxiety scale = .69. (α = .69), coefficient alpha for depression scale = .79. (α = .79), and coefficient alpha for hostility scale = .80. (α = .80) when tested with 746 adolescents. Validity: - Shown convergent and discriminant validity.	Original scale standardization for male college students (*n*=44): - *M*=6.9 (*SD*=3.3) Anxiety. - *M*=14.7 (*SD*=7.4) Depression - *M*=8.5 (*SD*=4.0) Hostility Female college students (*n*=31): - *M*=6.3 (*SD*=4.0) Anxiety - *M*=13.6 (*SD*=6.9) Depression - *M*=7.2 (*SD*=3.8) Hostility.	- 132-item scale. - Each word describes: (a) being anxious, depressed, or hostile and is scored if the subject checks them, or (b) the opposite to being anxious, depressed, or hostile and scored if a subject does not check them. - High scores indicate high anxiety (maximum 21), depression (maximum 40), and hostility (maximum 30). Neutral words (*n*=41) are not scored.	- Scale scores treated as continuous variables, and if its necessary are categorized using scores above or below the median or quartiles	- Originally developed with job applicants, college students, and psychiatric patients. - All words are at or below an eight grade reading level.
The Attitudes About Weight and Dieting Scale (Crandall, 1994)	Internal reliability: - Coefficient alpha for dislike factor = .84 (α = .84), coefficient alpha for fear of fat factor = .79 (α = .79), and coefficient alpha for willpower factor = .66 (α = .66) when tested with 251 undergraduate students. Validity: - Correlated with other attitude measures.	- No information	- 13-item, 10-point Likert scale ranging from "strongly disagree" to "strongly agree". - Higher scores indicate more negative weight attitudes. - Pertinent items are summed and divided by number of items: dislike (maximum 9), fear of fat (maximum 9) and willpower (maximum 9).	- Scale scores treated as continuous variables, and if necessary are categorized using scores above or below the median or quartiles.	- Originally developed with undergraduate University students. - Reading level: administered to undergraduate University students

Name	Reliability/ Validity	Scale Standardization	Scoring/Marking Procedures	Cut-Off Scores	Administration Conditions/ Reading Level
Behaviour Intention: Healthy Eating and Physical Activity (Baker, et al., 2003).	Internal reliability: - Coefficient alpha = 0.91 for eating (α = .91) and 0.93 (α = .93) for activity when tested with 279 adolescents. Validity: - Considered valid in terms of face validity by Yale Center for Eating and Weight Disorders.	- No information.	- Four-item scales each for healthy eating and physical activity. - Two items directly assess intention: "I plan to . . ." and "I will try to . . ." on a 6-point Likert scale ranging from "strongly disagree" to "strongly agree". - Two other items assess expectations regarding the target behaviors: "How likely is it that you will [behaviour] over the next 2 weeks?" and "Thinking of your [behaviour] over the next 2 weeks, how often do you think you will [behaviour]?" on a 6-point Likert scale ranging from "very unlikely" to "very likely". - Each scale is scored by summing pertinent items and dividing by the number of items: intention (maximum 6), expect (maximum 6), and overall intention (maximum 6).	- Scale scores treated as continuous variables, and if necessary will be categorized using scores above or below the median or quartiles.	- Originally developed with adolescents. - Reading level: administered to adolescents aged 13 to 17 years.
The Exercise: Stages of Change Short Form (Prochaska, 1991; Marcus et al., 1992; Berry et al., 2005).	Test-retest reliability: - .78 kappa index of reliability over a two-week period. Validity: - Deemed valid in terms of construct validity.	- Employees (N=398): 7.3% Precontemplation, 23.1% Contemplation, 30.4% Preparation, 16.6% Action, 22.6% Maintenance, and 7% unclassifiable.	- Nominal measure. - Respondents grouped into one of five stages based on the item they endorse.	- Grouped into one of five stages: Precontemplation, Contemplation, Preparation, Action, or Maintenance.	- Originally developed with government and hospital employees. - Reading level: administered to adolescents 15 years of age.
Attitude, Believability, and Readability Constructs (Kelly et al., 2006).	Internal reliability: - Coefficient alpha for the attitude construct = .91 (α = .91), coefficient alpha for the believability construct = .70 (α = .70), and coefficient alpha for the readability construct = .86 (α = .86) when tested among 249 adolescents.	- N/A	- 7-point visual analogue scale. Higher scores indicate higher evaluations: overall (maximum 280), attitude (maximum 112), believability (maximum 112), and readability (maximum 56).	- Scale scores treated as continuous variables, and if necessary will be categorized using scores above or below the median or quartiles.	- Originally developed with US-based Mexican adolescents aged 12 to 14 years. - Reading level: administered to adolescents 12 years of age.

APPENDIX N:
PSA DATA GATHERING METHODS

Obesity-Relevant PSAs

An email was sent to the Social Marketing ListServ at Georgetown University and the Click 4HP List Serve (918 recipients received the email) at York University (Canada) requesting print advertisements that have been used for social marketing campaigns to promote health eating, physical activity, or both among adolescents. The Social Marketing ListServe was started at Georgetown University by Dr. Alan Andreasen as a forum for social marketing research, practice, and teaching. CLICK4HP listserv is a forum to discuss Canadian and global health promotion.

The following social marketing organizations were also emailed: Manifest Communications (Toronto, ON, Canada), Novartis Foundation (International), Better World Advertising (San Francisco, CA / New York, NY, USA), The Alder Group (Ottawa/Toronto, ON, Canada), The Health Communication Unit (Toronto, ON, Canada), Cullbridge Marketing and Communications (Ottawa, ON, Canada), Weinreich Communications (West Hills, CA, USA), Social Change Online (London, England, UK / Perth, WA / Melbourne, AU), Center for Advanced Studies in Nutrition and Social Marketing (Davis, CA, USA), WJ Schroer Company (Battle Creek, MI, USA), The Forster Company (London, UK), Ogilvy Public Relations Worldwide (International), JDG Communications (Falls Church, VA), Academy for Educational Development (Washington, DC), and Vanguard Communications (Denver, CO).

Control PSAs

Emails were sent to the Social Marketing ListServ and the Click4HP List Serve requesting health-related PSAs to use as control ads. Ads geared towards adolescents, which contained neutral health messages and did not relate to obesity prevention/reduction were requested. Internet research was also conducted using the search engine Google.

APPENDIX O:
COGNITIVE INTERVIEWING GUIDE

Introduction and ground rules: We are going to use a method of interviewing called "cognitive interviewing". During this process, the two of us will go through a questionnaire package. I will read each question to you, while you write down your answers. If any words or questions do not make sense, please highlight the words and provide an explanation about what you did not understand. I may interrupt at times to ask you questions. We are going to time how long it takes to go through the questionnaire package and at the end, I will also ask you some additional questions. It's important to note that I didn't make up these questionnaires so feel free to be as honest in your feedback as you like – your reactions will help improve the questions.

Respondent Introduction: Name, favorite TV show and why.

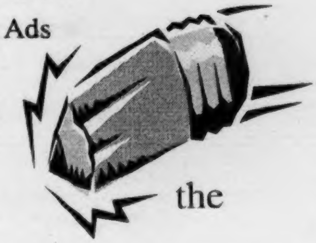
Questionnaire Administration: Great, now let's get started with the questionnaire package.

NOTE: For words or questions that the subject highlights, probes such as the following will be used:

Comprehension probe:	What does the term "……….." Mean to you?
Paraphrasing:	Can you repeat the question I just asked in your own words?

SAMPLE PRE-TEST PACKAGE COVER PAGE

Strengths and Weaknesses of Active Living and Healthy Eating Ads



Thank you for agreeing to help us by filling out these questionnaires.
Your feedback will help us make this better for the teens that will be in the real study.

We want to know how teens might react to filling out the questionnaires.

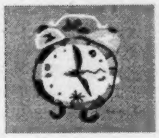
We need your feedback about:
- How long it takes to complete the set of questionnaires
- What it was like to complete the questionnaires
- What words or questions didn't make sense

CONFIDENTIAL

Please do not put your name on the package. Your answers will not be connected with your name. They will be kept completely confidential, so please feel free to fill them out according to your true feelings. Feel free to make up your answers – we are interested in what you think of the questions, and we will not treat your answers like "real" responses.

INSTRUCTIONS:

1. We are going to being with writing down the start time below:



Start: ________ am pm

2. Fill out the questionnaires in pencil
3. Use the **YELLOW** highlighter provided to highlight any words or questions that don't make sense to you. I will also take notes on the words or questions that don't make sense to you.

SAMPLE FEEDBACK PAGE

Yay you are finished the questionnaires!

Let's write down the finish time: Stop: ________ am pm

Please tell us what it was like for you to fill out these questionnaires by circling the words that apply below:

Easy Confusing Interesting Too personal Fun
Just long enough Too short Boring Too long
Difficult Embarrassing Too many *sensitive* questions
Too many *similar* questions Simple Lots of work

Now we are going to go back through the questionnaires and review the highlighted sections that didn't make sense to you. Afterwards, we will discuss the questions below and you can respond verbally or if you are more comfortable with doing so, you can write down your answers.

NOTES ABOUT HIGHLIGHTED SECTIONS: ADDITIONAL QUESTIONS

? **OVERALL:** Did you find any of the questionnaires to be too long/cumbersome to fill out? If yes, which one(s) and on what pages of this package?

? **MAACL:** Looking back on the MAACL questionnaire, are their any words that do not make sense to you? If yes, which ones? Are there any words you would use instead?

? **HEALTH EATING/PHYSICAL ACTIVITY INTENTION SCALE:** How did you arrive at that answer? Was that easy or hard to answer?

? **HEALTHY EATING/PHYSICAL ACTIVITY: STAGES OF CHANGE:** How did you arrive at that answer? Was that easy or hard to answer?

? **INTENTION SCALE AND STAGES OF CHANGE:** Do you understand this definition? Can you repeat this definition in your own words?

? **AD EVALUATION SCALE:** We also asked you to rate ads using a on a scale of 1 to 7. Would you have preferred rating these ads on a scale of 1 to 10? Why or why not?

? **AD EVALUATION SCALE:** You were asked to mark your feeling about ads from 10 statements. These statements are included below. If you were to use only 6 statements to describe the ads you saw, what statements would you use? Please put a check beside those you would use:

○ It isn't cool	☐ It's very cool
○ I don't like it at all	☐ I like it a lot
○ My FRIENDS wouldn't like it at all	☐ My FRIENDS would like it
○ It's not interesting at all	☐ It's very interesting
○ I don't believe what it's saying	☐ I believe what it's saying
○ It's not truthful at all	☐ It's very truthful
○ It doesn't make me want to eat healthy	☐ It makes me want to eat healthy
○ It doesn't make me want to exercise	☐ It makes me want to exercise
○ It's hard read	☐ It's easy to read
○ It's hard to understand	☐ It's easy to understand

? **AD EVALUATION SCALE:** Are there any statements that you feel are missing from the above list? If yes, which ones?

? **DEMOGRAPHICS QUESTIONNAIRE:** For question 9, are these the video games that should be included? Can you recommend others?

? **DEMOGRAPHICS QUESTIONNAIRE:** For question 10, should DVDs be included in this question? Why or why not?

? **DEMOGRAPHICS QUESTIONNAIRE:** For question 12, how did you arrive at that answer? Was that easy or hard to answer? How do you define serving?

Finally, please note:
Your Age: ________(years) Your Gender: M F

Thank you very much for your feedback!

APPENDIX P[14]:
SAMPLE MODERATOR GUIDE

I. **Introduction and ground rules**: opinions wanted, no right or wrong answers, agree to disagree, moderator is objective outsider here to listen to what it is you have to say, respect one another's views, taping of discussion.

Respondent Introduction: name, favorite TV show and why.

II. Reaction to the Advertising

Moderator will pass around all the advertisement in a random order to focus group participants. The group discussion will start as follows:

- What was your overall reaction to the advertising I just presented?
- What initial thoughts and feelings did you have?
- What is the main idea being presented? What is your reaction to that idea?
- What do you think the ads are trying to get people to do?
- Who are they aimed at? Do these ads talk to you? Are their any ads that don't talk to you? [PROBE: Small Steps body ads as well as Peel Public Health Bicycle and Soccer ads].
- Is there anything new being presented here? [PROBE: new ideas, new information, new ways of looking at or thinking about things?]
- What if anything did you like about the advertising?
- What if anything did you dislike about it?
- Is there anything confusing or hard to understand?
- Anything unbelievable or hard to believe in these ads?
- What is your favorite advertisement? What is your least favorite advertisement? Why?

The researcher will present proposed groupings to participants: body-image, health focused, non-health focused. The following questions will be asked:

- Do you agree/disagree with the groupings presented?
- What makes the ads in the first group similar – are there any that don't fit? [REPEAT FOR EACH] Why? [PROBE other types of groupings]

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[14] Adapted and modified from "The role of formative research in a mass media social marketing campaign" by T. Eitel, & B. Delaney, 2004, In *Social Marketing Quarterly, 10*, p. 31.

APPENDIX Q:
CONSENT FORMS

CONSENT FORM FOR PARENTS: PRE-TEST

TITLE: *Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity*

INVESTIGATORS: *Principle Investigator - Dr. Carol Adair*
Co-Investigators - Jennifer Dooley and Dr. Sameer Desphande

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form.

BACKGROUND

Your adolescent is being asked to participate in a one-on-one interview testing several questionnaires that will be used in a main study with adolescents.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of the overall project is to examine how health promoting print advertisements can be used to prevent adolescent obesity and identify/avoid unintended effects such as weight concerns, poor self-esteem, negative mood, dieting, and eating disorders among adolescents. The information will be used in the future to develop successful media-based interventions for the prevention and reduction of adolescent obesity.

WHAT WOULD I HAVE TO DO?

If you and he/she agree to take part he/she will:

- *Be asked to fill out eight brief questionnaires and participate in a one-on-one interview about the questionnaire items. This discussion will centre on how well they understand the questionnaire items and the terms used in them.*
- *The questionnaire completion and interview will take about 60 minutes.*
- *The questionnaires are on the topics of body satisfaction, self-esteem, mood, exercise and nutrition habits, as well as their reactions to the ads.*
- *General study results will be made available to you should you indicate that you wish to receive them.*

WHAT ARE THE RISKS?

There is no known risk in taking part, but if your adolescent has questions or concerns related to the discussion he or she will be given follow-up information and resources.

WILL I BENEFIT IF I TAKE PART?

Your adolescent will not have any direct benefit from taking part except for having a chance to contribute to the development of print advertisements that may ultimately benefit other young persons in terms of healthy eating and active living.

DO I HAVE TO PARTICIPATE?

Your adolescent is under no obligation to take part and participation is voluntary. He or she can refuse to answer any of the questions, or leave the discussion at any time he/she wishes.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

Note that research participants will be reimbursed for public transit or parking costs if needed.

WILL MY RECORDS BE KEPT PRIVATE?

The researcher will make notes on your adolescent's responses to the questionnaires, but no identifying information will be collected or kept, with the exception of your signatures on this consent form.

SIGNATURES

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. If you have further questions concerning matters related to this research, please contact:

Dr. Carol Adair (403) 210-8805

Or

Jennifer Dooley (403) 614-4091

If you have any questions concerning your rights as a possible participant in this research, please contact the Ethics Resource Officer, University of Calgary, at 220-3782.

Participant's Name ______ Signature and Date ______

Investigator/Delegate's Name ______ Signature and Date ______

Witness' Name ______ Signature and Date ______

The University of Calgary Conjoint Health Research Ethics Board has approved this research study.

A signed copy of this consent form has been given to you to keep for your records and reference.

CONSENT FORM FOR PARTICIPANTS 14+ YEARS OF AGE: PRE-TEST

TITLE: *Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity*

INVESTIGATORS: *Principle Investigator - Dr. Carol Adair*
Co-Investigators - Jennifer Dooley and Dr. Sameer Desphande

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form.

BACKGROUND

You are being asked to participate in a one-on-one interview testing several questionnaires that will be used in a main study with adolescents.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of the overall project is to examine how health promoting print advertisements can be used to prevent adolescent obesity and identify/avoid unintended effects such as weight concerns, poor self-esteem, negative mood, dieting, and eating disorders among adolescents. The information will be used in the future to develop successful media-based interventions for the prevention and reduction of adolescent obesity.

WHAT WOULD I HAVE TO DO?

If you agree to take part you will:

- *Be asked to fill out eight brief questionnaires and participate in a one-on-one interview about the questionnaire items. This discussion will centre on how well you understand the questionnaire items and the terms used in them.*
- *The questionnaire completion and interview will take about 60 minutes.*
- *The questionnaires are on the topics of body satisfaction, self-esteem, mood, exercise and nutrition habits, as well as your reactions to the ads.*
- *General study results will be made available to you should you indicate that you wish to receive them.*

WHAT ARE THE RISKS?

There is no known risk in taking part, but if you have questions or concerns related to the discussion you will be given follow-up information and resources.

WILL I BENEFIT IF I TAKE PART?

You will not have any direct benefit from taking part except for having a chance to contribute to the development of print advertisements that may ultimately benefit other young persons in terms of healthy eating and active living.

DO I HAVE TO PARTICIPATE?

You are under no obligation to take part and participation is voluntary. You can refuse to answer any of the questions, or leave the discussion at any time you wish.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

Note that research participants will be reimbursed for public transit or parking costs if needed.

WILL MY RECORDS BE KEPT PRIVATE?

The researcher will make notes on your responses to the questionnaires, but no identifying information will be collected or kept, with the exception of your signatures on this consent form.

SIGNATURES

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. If you have further questions concerning matters related to this research, please contact:

Dr. Carol Adair	(403) 210-8805

Or

Jennifer Dooley	(403) 614-4091

If you have any questions concerning your rights as a possible participant in this research, please contact the Ethics Resource Officer, University of Calgary, at 220-3782.

Participant's Name	Signature and Date
Investigator/Delegate's Name	Signature and Date
Witness' Name	Signature and Date

The University of Calgary Conjoint Health Research Ethics Board has approved this research study.

A signed copy of this consent form has been given to you to keep for your records and reference.

CONSENT FORM FOR PARENTS: FOCUS GROUPS

TITLE: *Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity*

INVESTIGATORS: *Principle Investigator - Dr. Carol Adair*
Co-Investigators - Jennifer Dooley and Dr. Sameer Desphande

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form.

BACKGROUND

Your adolescent is being asked to join a focus group discussion and express her/his thoughts and reactions to print advertisements. The group will include 5-7 other members of the same sex that may or may not be known to him/her.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of this project is to gauge reactions from adolescents about print advertisements aimed at promoting healthy eating and exercise. The information will be used in the future to determine how print-based messages can be used effectively to prevent adolescent obesity.

WHAT WOULD I HAVE TO DO?

If you agree that he/she can take part, and he/she is willing, he/she will:

- *Be shown a group of print ads and asked to assess the strengths and weaknesses of them in a group discussion. The following information will be gathered: overall reactions, top of mind feelings, main ideas being presented, likes/dislikes, favorites, and agreement towards groupings developed by the researcher. The discussion should take approximately 90 minutes.*
- *General study results will be made available to you should you indicate that you wish to receive them.*

WHAT ARE THE RISKS?

There is no known risk in taking part, but if your adolescent has questions or concerns related to the ads or the discussion he or she will be given follow-up information and resources.

WILL I BENEFIT IF I TAKE PART?

Your adolescent will not have any direct benefit from taking part except for having a chance to contribute to the development of print advertisements that may ultimately benefit other young persons to eat healthy and be active.

DO I HAVE TO PARTICIPATE?

Your adolescent is under no obligation to take part and participation is voluntary. He or she can refuse to answer any of the questions in the group, or leave the group discussion at any time he/she wishes.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

Note that research participants will be reimbursed for public transit or parking costs if needed.

WILL MY RECORDS BE KEPT PRIVATE?

All focus groups will be audio taped, transcribed, and coded for key ideas and descriptive questions. The researcher will keep the identity of the participants confidential and the audio tapes will be destroyed as required by the ethics committee.

SIGNATURES

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. If you have further questions concerning matters related to this research, please contact:

Dr. Carol Adair	(403) 210-8805
Or	
Jennifer Dooley	(403) 614-4091

If you have any questions concerning your rights as a possible participant in this research, please contact the Ethics Resource Officer, University of Calgary, at 220-3782.

Participant's Name	Signature and Date
Investigator/Delegate's Name	Signature and Date
Witness' Name	Signature and Date

The University of Calgary Conjoint Health Research Ethics Board has approved this research study.

A signed copy of this consent form has been given to you to keep for your records and reference.

CONSENT FORM FOR PARTICIPANTS 14+ YEARS OF AGE: FOCUS GROUPS

TITLE: *Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity*

INVESTIGATORS: *Principle Investigator - Dr. Carol Adair*
Co-Investigators - Jennifer Dooley and Dr. Sameer Desphande

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form.

BACKGROUND

You are being asked to join a focus group discussion and express your thoughts and reactions to print advertisements. The group will include 5-7 other members of the same sex that may or may not be known to you.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of this project is to gauge reactions from adolescents about print advertisements aimed at promoting healthy eating and exercise. The information will be used in the future to determine how print-based messages can be used effectively to prevent adolescent obesity.

WHAT WOULD I HAVE TO DO?

If you agree to take part, you will:

- *Be shown a group of print ads and asked to assess the strengths and weaknesses of them in a group discussion. The following information will be gathered: overall reactions, top of mind feelings about them, main ideas being presented, likes/dislikes, favorites, and agreement towards groupings developed by the researcher. The discussion should take approximately 90 minutes.*
- *General study results will be made available to you should you indicate that you wish to receive them.*

WHAT ARE THE RISKS?

There is no known risk in taking part, but if you have questions or concerns related to the ads or the discussion you will be given follow-up information and resources.

WILL I BENEFIT IF I TAKE PART?

You will not have any direct benefit from taking part except for having a chance to contribute to the development of print advertisements that may ultimately benefit other young persons to eat healthy and be active.

DO I HAVE TO PARTICIPATE?

You are under no obligation to take part and can refuse to answer any of the questions in the group, or leave the group discussion at any time.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

Note that research participants will be reimbursed for public transit or parking costs if needed.

WILL MY RECORDS BE KEPT PRIVATE?

All focus groups will be audio taped, transcribed, and coded for key ideas and descriptive questions. The researcher will keep the identity of the participants confidential and the audio tapes will be destroyed as required by the ethics committee.

SIGNATURES

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. If you have further questions concerning matters related to this research, please contact:

Dr. Carol Adair	(403) 210-8805
Or	
Jennifer Dooley	(403) 614-4091

If you have any questions concerning your rights as a possible participant in this research, please contact the Ethics Resource Officer, University of Calgary, at 220-3782.

Participant's Name	Signature and Date
Investigator/Delegate's Name	Signature and Date
Witness' Name	Signature and Date

The University of Calgary Conjoint Health Research Ethics Board has approved this research study.

A signed copy of this consent form has been given to you to keep for your records and reference.

CONSENT FOR PARENTS: ADVERTISEMENT TESTING

TITLE: *Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity*

INVESTIGATORS: *Principle Investigator - Dr. Carol Adair*
Co-Investigators - Jennifer Dooley and Dr. Sameer Desphande

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form.

BACKGROUND

Your adolescent is being asked to participate in an experiment about the immediate effects of ads aimed at healthy eating and active living.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of this project is to examine how health promoting print advertisements can be used to prevent adolescent obesity, and identify/avoid unintended effects such as weight concerns, poor self-esteem, negative mood, dieting, and eating disorders among adolescents. The information will be used in the future to develop successful media-based interventions for the prevention and reduction of adolescent obesity.

WHAT WOULD I HAVE TO DO?

Your adolescent is being asked to fill out eight questionnaires that measure a variety of psychological responses to advertisements. If you and he/she agree to take part he/she will:

- *Be randomly assigned to view one of four sets of print advertisements. The sets are: (a) body-image focused, (b) health message focused, (c) non-health focused, or (d) general health-related advertisements not related to healthy eating/active living.*
- *Fill out eight brief questionnaires that measure weight attitudes, self-esteem, mood, healthy eating intention, physical activity intention, exercise stages of change, nutrition stages of change, and advertisement evaluation. The overall research time should be approximately 90 minutes.*
- *General study results will be made available to you should you indicate that you wish to receive them.*

WHAT ARE THE RISKS?

There is no known risk in taking part; however, he or she will receive a full explanation of the issues being studied at the end of the session and will be given contact information for follow-up if he/she or you have any concerns.

WILL I BENEFIT IF I TAKE PART?

Your adolescent will not have any direct benefit from taking part except for having a chance to contribute to the development of print advertisements that may ultimately benefit other young persons in terms of healthy eating and active living.

DO I HAVE TO PARTICIPATE?

Your adolescent is under no obligation to take part. He or she can refuse to answer any of the questions in the group, or leave the research session at any time he/she wishes.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

Note that research participants will be reimbursed for public transit or parking costs if needed.

WILL MY RECORDS BE KEPT PRIVATE?

The researcher will keep the identity of the participants confidential. After each time he/she fills out questionnaires, a code number will be assigned to each set for data entry and analysis. The completed questionnaires will be kept in a filing cabinet that only the researchers have access to.

SIGNATURES

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. If you have further questions concerning matters related to this research, please contact:

Dr. Carol Adair	(403) 210-8805
Or	
Jennifer Dooley	(403) 614-4091

If you have any questions concerning your rights as a possible participant in this research, please contact the Ethics Resource Officer, University of Calgary, at 220-3782.

Participant's Name	Signature and Date
Investigator/Delegate's Name	Signature and Date
Witness' Name	Signature and Date

The University of Calgary Conjoint Health Research Ethics Board has approved this research study.

A signed copy of this consent form has been given to you to keep for your records and reference.

CONSENT FOR PARTICIPANTS 14+ YEARS OF AGE: ADVERTISEMENT TESTING

TITLE: *Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity*

INVESTIGATORS: *Principle Investigator - Dr. Carol Adair*
Co-Investigators - Jennifer Dooley and Dr. Sameer Desphande

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form.

BACKGROUND

You are being asked to participate in an experiment about the immediate effects of ads aimed at healthy eating and active living.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of this project is to examine how health promoting print advertisements can be used to prevent adolescent obesity, and identify/avoid unintended effects such as weight concerns, poor self-esteem, negative mood, dieting, and eating disorders among adolescents. The information will be used in the future to develop successful media-based interventions for the prevention and reduction of adolescent obesity.

WHAT WOULD I HAVE TO DO?

You are being asked to fill out eight questionnaires that measure a variety of psychological responses to advertisements. If you agree to take part you will:

- *Be randomly assigned to view one of four sets of print advertisements. The sets are: (a) body-image focused, (b) health message focused, (c) non-health focused, or (d) general health-related advertisements not related to healthy eating/active living.*
- *Fill out eight brief questionnaires that measure weight attitudes, self-esteem, mood, healthy eating intention, physical activity intention, exercise stages of change, nutrition stages of change, and advertisement evaluation. The overall research time should be approximately 90 minutes.*
- *General study results will be made available to you should you indicate that you wish to receive them.*

WHAT ARE THE RISKS?

There is no known risk in taking part; however, you will receive a full explanation of the issues being studied at the end of the session and will be given contact information for follow-up if you have any concerns.

WILL I BENEFIT IF I TAKE PART?

You will not have any direct benefit from taking part except for having a chance to contribute to the development of print advertisements that may ultimately benefit other young persons in terms of healthy eating and active living.

DO I HAVE TO PARTICIPATE?

You are under no obligation to take part. You can refuse to answer any of the questions, or leave the research session at any time you wish.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

Note that research participants will be reimbursed for public transit or parking costs if needed.

WILL MY RECORDS BE KEPT PRIVATE?

The researcher will keep the identity of the participants confidential. After each time you fill out questionnaires, a code number will be assigned to each set for data entry and analysis. The completed questionnaires will be kept in a filing cabinet that only the researchers have access to.

SIGNATURES

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. If you have further questions concerning matters related to this research, please contact:

Dr. Carol Adair (403) 210-8805

Or

Jennifer Dooley (403) 614-4091

If you have any questions concerning your rights as a possible participant in this research, please contact the Ethics Resource Officer, University of Calgary, at 220-3782.

Participant's Name — Signature and Date

Investigator/Delegate's Name — Signature and Date

Witness' Name — Signature and Date

The University of Calgary Conjoint Health Research Ethics Board has approved this research study.

A signed copy of this consent form has been given to you to keep for your records and reference.

APPENDIX R:
DEBRIEFING FORMS

DEBRIEFING FORM FOR PARTICIPANTS – PRE-TEST

The results from the current research will be utilized for the upcoming thesis study: *Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity.* You were asked to fill out various questionnaires on body satisfaction, self-esteem, mood, physical activity and nutrition habits, as well as advertisement evaluation and participate in a one-on-one interview about the questionnaire items.

The questionnaires are being used for a study that looks at the best way to use advertising to encourage healthy eating and active living among teens. If you have any personal concerns as a result from participating in this study please contact Dr. Carol Adair at 403-210-8805. You can also call the Alberta Mental Health Line at 1-877-303-2642 or the Calgary Health Region Health Link at 943-LINK (5465).

The following websites are useful resources for information on social marketing and promotion of physical activity/healthy eating:

a. http://www.hc-sc.gc.ca/ahc-asc/activit/marketsoc/index_e.html
b. www.cde.state.co.us/cdenutritran/download/pdf/Marketiiddlegrade.pdf
c. http://www.verbnow.com/
d. http://www.go2calgary.com
e. http://www.eatwell.gov.uk/agesandstages/teens/

The following websites are also useful resources for healthy body-image:

a. http://www.region.peel.on.ca/health/commhlth/bodyimg/bintro.htm#4
b. http://www.bodypositive.com
c. http://www.goforyourlife.vic.gov.au/hav/articles.nsf/webl2ls?openview&restricttocategory=body+image+-+teenagers&count=10&start=1&lifestage=teenagers
d. http://www.cyh.com/HealthTopics/HealthTopicDetails.aspx?p=243&np=293&id=2248

DEBRIEFING FORM FOR PARTICIPANTS – FOCUS GROUP REACTIONS

The results from the current research will be used for the upcoming thesis study: *Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity.* You were involved in a discussion about advertisements aimed at preventing obesity mainly through encouragement of physical activity and healthy eating.

The ads discussed the benefits of healthy eating/physical activity in one of three ways: health benefits, social or fun benefits, and body-image benefits. The study was done to learn more about the best way to use advertising to encourage healthy eating and active living among teens. If you have any personal concerns as a result from participating in this study please contact Dr. Carol Adair at 403-210-8805. You can also call the Alberta Mental Health Line at 1-877-303-2642 or the Calgary Health Region Health Link at 943-LINK (5465).

The following websites are useful resources for information on social marketing and promotion of physical activity/healthy eating:

a. http://www.hc-sc.gc.ca/ahc-asc/activit/marketsoc/index_e.html
b. www.cde.state.co.us/cdenutritran/download/pdf/Marketiiddlegrade.pdf
c. http://www.verbnow.com/
d. http://www.go2calgary.com
e. http://www.eatwell.gov.uk/agesandstages/teens/

The following websites are also useful resources for healthy body-image:

a. http://www.region.peel.on.ca/health/commhlth/bodyimg/bintro.htm#4
b. http://www.bodypositive.com
c. http://www.goforyourlife.vic.gov.au/hav/articles.nsf/webl2ls?openview&restricttocategory=body+image+-+teenagers&count=10&start=1&lifestage=teenagers
d. http://www.cyh.com/HealthTopics/HealthTopicDetails.aspx?p=243&np=293&id=2248

DEBRIEFING FORM FOR PARTICIPANTS – CAMPAIGN CONCEPT TESTING

The results from the current research will be utilized for the upcoming thesis study: *Immediate Effects of Public Service Advertisements aimed at Preventing and Reducing Adolescent Obesity.* You were asked to fill out the following surveys before and after exposure to a set of advertisements: the State Self-Esteem Scale, the Multiple Affect Adjective Check List, a Healthy Eating Intention Scale, a Physical Activity Intention Scale, the Physical Activity: Stages of Change Short Form, and the Healthy Eating: Stages Of Change Form. You also filled out an Ad Evaluation Scale and the Attitudes about Weight and Dieting Scale after viewing the ads.

The ads discussed the benefits of healthy eating/physical activity in one of three ways: health benefits, social or fun benefits, and body-image benefits. Some participants were shown health ads that did not relate to healthy eating/physical activity. The study was done to learn more about the best way to use advertising to encourage healthy eating and active living among teens. If you have any personal concerns as a result from participating in this study please contact Dr. Carol Adair at 403-210-8805. You can also call the Alberta Mental Health Line at 1-877-303-2642 or the Calgary Health Region Health Link at 943-LINK (5465).

The following websites are useful resources for information on social marketing and promotion of physical activity/healthy eating:

a. http://www.hc-sc.gc.ca/ahc-asc/activit/marketsoc/index_e.html
b. www.cde.state.co.us/cdenutritran/download/pdf/Marketiiddlegrade.pdf
c. http://www.verbnow.com/
d. http://www.go2calgary.com
e. http://www.eatwell.gov.uk/agesandstages/teens/

The following websites are also useful resources for healthy body-image:

a. http://www.region.peel.on.ca/health/commhlth/bodyimg/bintro.htm#4
b. http://www.bodypositive.com
c. http://www.goforyourlife.vic.gov.au/hav/articles.nsf/webl2ls?openview&restricttocategory=body+image+-+teenagers&count=10&start=1&lifestage=teenagers
d. http://www.cyh.com/HealthTopics/HealthTopicDetails.aspx?p=243&np=293&id=2248

APPENDIX S:
SPSS DATA ENTRY PROCEDURES

All data was entered into SPSS. Variables were named horizontally and data entered vertically by case number. The following demographic variables were included: age (years), gender (categorical, represented by 1 for male or 2 for female), socioeconomic status (continuous score), language (categorical, represented by 1-3 for English, French, or Other), birth city (categorical, represented by 1 for Calgary and 2 for other birth city), school grade (continuous score), self-perceived health (categorical, represented by 1-5 ranging from "excellent" to "poor" health), screen time (continuous score), culture (categorical, represented by 1-14 in accordance with the questionnaire and an additional category for multi-cultured background), daily fruit and vegetable consumption (continuous score), and physical activity (continuous score).

Independent and dependent variables included: testing condition (categorical, signified by 1-4 for body-image, health, non-health, and control), weight attitude (continuous overall post score as well as dislike, fear of fat, and willpower factors), state self-esteem (continuous pre and post scores for the entire scale as well as performance self-esteem, social self-esteem and appearance self-esteem factors), mood (continuous pre and post scores for the entire scale as well as anxiety, depression, and hostility factors), healthy eating/physical activity intention (continuous pre and post scores for both scales as well as intention and expect factors), physical activity/healthy eating stages of change (categorical pre and post scores for both scales represented by 1-5 ranging from Precontemplation to Maintenance), and ad evaluation (continuous scores for the entire scale and attitude, believability, and readability factors).

APPENDIX T: PHASE II PRE-TEST RESULTS

State Self-Esteem Scale

Pre-test participants received the SSES (Heatherton & Polivy, 1991) positively. The majority (nine in ten) did not find the words or questions confusing. One participant was confused with the word scholastic in question 18 (I feel that I have less scholastic ability right now than others). To aid in comprehension, the scale was revised for the main experiment to include the word school in brackets beside scholastic.

Multiple Affect Adjective Check List

During pre-test administration of the MAACL (Zuckerman & Lubin, 1965, 1985) a number of participants commented on words that they either did not understand or found confusing: amiable (3 participants), destroyed (1 participant), forlorn (1 participant), meek (1 participant), sullen (1 participant), sunk (1 participant), vexed (3 participants), and wilted (3 participants). Examples of better words were gathered from participants to describe confusing words and resulted in the following suggestions: nice (to describe amiable), hurt (to describe destroyed), sad (to describe sullen), down (to describe sunk), angry (to describe vexed), and unhappy/depressed/broken (to describe wilted). Participants were unable to give examples for the words forlorn and meek.

Since the MAACL is a standardized instrument, words were not deleted but instead the following alternate ones were included in parenthesis for the main study to aid in comprehension: nice (amiable), hurt (destroyed), depressed (forlorn), subdued (meek), sulky (sullen), down (sunk), aggravated (vexed), and limp (wilted).

The Attitudes about Weight and Dieting Scale

When administering the AAWAD (Crandall, 1994), pre-test participants filled out the questionnaires with ease. Three of the older participants (aged 16 to 17 years of age) mentioned that they found the scale to be too critical of overweight participants, which prompted them to answer the questionnaire on either polarities of the scale. To reduce the critical tone of the AAWAD scale, a suggestion was given to replace the term fat with overweight throughout the instrument. It was also suggested that the term unhappy be used instead of disgusted for question 2 (I feel disgusted with myself when I gain weight).

Since the nature of this instrument is to measure negative attitudes towards overweight people, and only one participant suggested making changes to the scale, no changes were made to this instrument for the main study.

Healthy Eating and Physical Activity Intention Scales

Pre-test participants found the healthy eating and physical activity intention scales (Baker et al., 2003) to be repetitive and several suggested the instructions include the statement, read each item carefully, to help individuals focus on each item. The original scale contained lettering in the healthy eating and physical activity definitions which pre-test participants found confusing. One participant administered the physical activity intention scale mentioned that question 4 (thinking of your physical activity behaviour over the next 2 weeks, how often do you think you will be physically active?) was difficult to answer based on a Likert scale (ranging from "very unlikely" to "very likely") as it prompted them to give a number.

For the main study, the physical activity and healthy eating intention scales were modified for question 4 as follows: thinking of your (physical activity/healthy eating) behaviour over the next 2 weeks, do you think you will participate in regular (physical activity/healthy eating)? Lettering was removed from both definitions.

Stages of Change Scales

Pre-test participants were not favorable towards the Physical Activity: Stages of Change and Healthy Eating: Stages of Change scales (Prochaska, 1991). When asked if they preferred the intention or stages of change scales, seven in ten participants answered the intention scales. One participant was unsure and two preferred the stages of change scales. After probing further, the researcher learned that pre-test participants found it difficult to rate each statement on a Likert scale (ranging from "strongly agree" to "strongly disagree"). Nine in 10 participants checked strongly agree or agree to the first statement (maintenance stage for physical activity and/or healthy eating). These results may be a function of the type of participants interviewed during the pre-test or the social desirability bias.

For the main experiment, the definitions in the intention and stages of change scale were revised. The term sugar was added to the healthy eating definition (e.g., not too much fat or sugar) and the statement, being a healthy eater, was changed to healthy eating to reduce social desirability (the wording within the healthy eating intention scale was updated accordingly). The sentence, sometimes, in our current environments, its difficult to eat healthy/be physically active, was also added to the end of each definition to further diminish social desirability. The Likert scale was also removed to reduce confusion among participants and the scale was formatted to its original marking scheme, whereby a subject makes one choice based on the physical activity/healthy eating stage.

Ad Evaluation Scale

Pre-test participants found the ad evaluation scale easy to fill out (Kelly et al., 2006). A few were confused about the instructions and did not realize that each page related to only one PSA. When asked if they preferred a rating scale of one to seven versus one to ten, mixed answers were given – some preferred the former (five participants), others preferred the latter (three participants), and a few didn't care either way (two participants). When asked to narrow down the ten statements describing the PSAs to six ones, the majority felt the following should be removed: it isn't cool versus it's very cool (nine participants), my friends wouldn't like it at all versus my friends would like it a lot (eight participants), it's not truthful at all versus it's very truthful (seven participants), it's hard to read versus it's easy to read (six participants), and I don't believe what it's saying versus I believe what its saying (five participants). Several also suggested that the following statements could be included: it isn't eye catching at all versus it's very eye catching (five participants) and it isn't memorable at all versus it's very memorable (three participants).

For the main experiment, the term eye catching was added to the statement it's not interesting/eye catching at all versus it's very interesting/eye catching in the Ad Evaluation Scale. Instructions were also updated to provide clarity. Otherwise, all statements remained consistent following the pre-test to maintain robust factors and consistent internal reliabilities for the attitude, believability, and readability constructs.

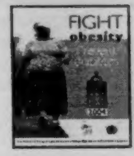
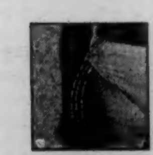
Demographics Questionnaire

Pre-test participants found the following terms in questions eight through 10 to be outdated in the Demographics Questionnaire (Shields, 2005): World Wide Web (how much time did you usually spend on a computer, including playing computer games and using the Internet or World Wide Web?), Sega (in a typical week in the past three months, how much time did you usually spend playing video games, such as…) and videos (in a typical week in the past three months, how much time did you usually spend watching television or videos). One participant was sensitive towards question 11, asking them to define their cultural and racial background. Although participants were able to describe the portion size for fruits in question 12 (how many servings of fruits and vegetables do you usually eat each day), they found it difficult to describe the portion size for vegetables. Participants also found it challenging to read through questions 13 through 16 (describing different types of physical activity).

The following terms were deleted for the main experiment: World Wide Web, Sega (replaced by Xbox) and videos (replaced with movies). For question 11, ethnic was used to replace racial and the statement, please remember that your answers to these questions are confidential, was added to the instructions for this questionnaire. For question 12, an example was given from the Canadian Health Network (2005) describing portion size. Titles were also added to questions 13 through 16 to ease readability.

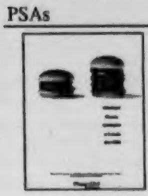
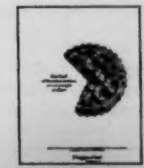
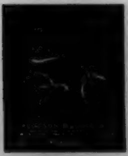
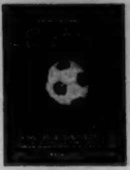
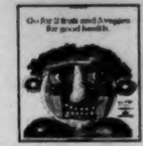
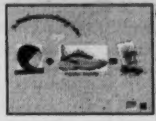
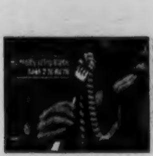
APPENDIX U:
FOCUS GROUP RESULTS - BODY-IMAGE ADVERTISEMENTS

Body-Image PSA Reactions

Body-Image PSAs	Campaign / Funder	Included (Yes or No)	Female Comments	Male Comments
	Small Steps / Ad Council and U.S. Department of Health & Human Services	Yes	- Example comments: "good for everyone" and "in your face". - Females felt this PSA should be included.	- Example comments: "there is a focal point", "too old" and "I know right away, we are talking about obese people". - Males gave mixed reactions about whether this PSA should be included.
	Small Steps / Ad Council and U.S. Department of Health & Human Services	Yes	- Example comments: "catches my eye", "wide target audience" and "this one is really edgy, it's in your face. I would really look at it". - Females felt this PSA should be included.	- Example comments: "she looks overweight" and "neutral ad". - Males gave mixed reactions about whether this PSA should be included.
	Small Steps / Ad Council and U.S. Department of Health & Human Services	Yes	- One participant rated as favorite. - Example comments: "good for everyone", "in your face", "Diversity. Or she?", and "that one really got to me. It's a good one". - Females felt this PSA should be included.	- Example comments: "that is effective" and "it comes back to the color: red and yellow". - Males felt this PSA should be included.
	Fight Obesity / International Diabetes Federation and the World Health Organization	Yes	- One participant rated as least favorite. - Example comments: "targets the individual in a bad way", "only talks to very obese", "degrading", and "stylistically not appealing". - Females felt this PSA should not be included.	- Example comments: "I like it. I like the colors, simplicity, and it gets the points across right away" and "her facial impression conveys a positive attitude". - Males felt this PSA should be included.
	Stop Childhood Obesity Now / Peel Public Health	No	- Two of six participants rated as favorite. - Example comments: "white space" and "the text is with the visual". - Females felt this PSA should be included.	- One participant rated as least favorite. - Example comments: "I think of my grandpa after a Christmas dinner" and "that belt isn't stylish". - Males gave mixed reactions about whether this PSA should be included.
	Small Steps / Ad Council and U.S. Department of Health & Human Services	No	- Example comments: "It would shock teens into realizing", "I'm sure everyone has cellulite, even the skinniest people...it appeals to a wider range", and "the bathing suit is better, because a side angle". - Females felt this PSA should not be included.	- One participant rated as least favorite. - Example comments :"is that head on? That's confusing", "it's inappropriate" and "there is no focal point". - Males felt this PSA should not be included.
	Small Steps / Ad Council and U.S. Department of Health & Human Services	No	- One participant rated as least favorite. - Example comments: "looks like a rock", "I think people might just laugh" and "lame". - Females felt this PSA should not be included.	- Example comments: "the images don't look like what they are". - Males felt this PSA should not be included.
	Small Steps / Ad Council and U.S. Department of Health & Human Services	No	- Example comments: "I don't really get the point of it", "it wouldn't catch my attention. It's not bright and colorful" and "they look so weird". - Females felt this PSA should not be included.	- One participant rated as favorite. - Example comments: "both look like noses to me", "its not logical", "it's grotesque", and "older people". - Males gave mixed reactions about whether this PSA should be included.

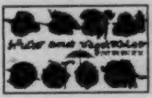
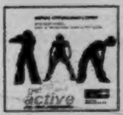
FOCUS GROUP RESULTS – HEALTH FOCUSED ADVERTISEMENTS

Health Focused PSA Reactions

Health Focused PSAs	Campaign / Funder	Included (Yes or No)	Female Comments	Male Comments
	Stop Childhood Obesity Now / Peel Public Health	Yes	- Three participants rated as favorite. - Example comments: "you are forced to read it" and "Childhood Obesity has tripled and you have a triple patty, I think that really gives a good indication". - Females felt this PSA should be included.	- Two participants rated as favorite. - Example comments: "visual, ironic, funny", "geared to eating a burger", "white background and color used effectively", and "text is underneath the picture". - Males felt this PSA should be included.
	Stop Childhood Obesity Now / Peel Public Health	Yes	- Example comments: "one third. That's clear.", "it's not hard to figure out" and "so clear, the text is with the visual". - Females felt this PSA should be included.	- Example comments: "they don't have a call to action", "homemade is healthy" and "there is no solution". - Males gave mixed reactions about whether this PSA should be included.
	Stop Childhood Obesity Now / Peel Public Health	Yes	- Example comments: "it is too busy", "the bike is outdated", "the bike is not bad", and "diabetes makes sense". - Females gave mixed reactions about whether this PSA should be included.	- Example comments: "maybe not a bike that looks like it's from 1962", "cluttered" and "old fashioned, more leisure type of sport needed". - Males gave mixed reactions about whether this PSA should be included.
	Stop Childhood Obesity Now / Peel Public Health	Yes	- Example comments: "don't speak to you", "I don't spend the time to read it", "elementary", and "what does cancer have to do with the ad?", "I don't mind the soccer one", - Females gave mixed reactions about whether this PSA should be included.	- One participant rated as favorite. - Example comments: "soccer is appealing", "good contrast", "lots of color", and "text is unclear". - Males felt this PSA should be included.
	Go For 2 & 5 Veg Campaign / Australian Government	No	- Example comments: "doesn't speak to me", "it's like Mr. Potato Head" and "way to make a typo". - Females gave mixed reactions about whether this PSA should be included.	- Example comments: "childish" and "really clever". - Males gave mixed reactions about whether this PSA should be included.
	California Project LEAN - Food On The RUN / California Department of Health Services and the Public Health Institute	No	- One participant rated as least favorite. - Example comments: "outdated shoe – need new shoes that are in", "the yellow is not good" and "far away that does not look like a light switch – red bull". - Females felt this PSA should not be included.	- Example comments: "you are not really drawn to anything", "what is that? It looks like a Tetrus block", "unprofessional" and "you would buy the shoe at Wal-Mart". - Males felt this PSA should not be included.
	Scotland Healthy Living / Scottish Executive – NHS Health Scotland	No	- Example comments: "unique", "new, original, sophisticated look", "funny", "appealing", and "I don't know if it's because I'm calling to talk about being bulimic or anorexic or overweight". - Females felt this PSA should be included.	- One participant rated as favorite. Two participants rated as least favorite. - Example comments: "silly", "clever", "doesn't make sense", and "color is a bit dull". - Males gave mixed reactions about whether this PSA should be included.

FOCUS GROUP RESULTS – NON-HEALTH FOCUSED ADVERTISEMENTS

Non- Health Focused PSA Reactions

Non-Health Focused PSAs	Campaign / Funder	Included (Yes or No)	Female Comments	Male Comments
	Do What Moves You: Verb / CDC	Yes	- Example comments: "I like the white background" and "it grab's your attention". - Females felt this PSA should be included.	- One participant rated as favorite. - Example comments: "it's a bit too young", "it could be aimed for parents as well" and "I like the simplicity". - Males felt this PSA should be included.
	Do What Moves You: Verb / CDC	Yes	- Example comments: "good style", "good visual", "the girls a bit young for the age group though", and "I like the images". - Females felt this PSA should be included.	- Example comments: "I do like the ad" and "unlimited options". - Males felt this PSA should be included.
	Eat Smart Play Hard™ / U.S. Department of Agriculture Food and Nutrition Service	Yes	- Example comments: "don't like the cartoon or the red", "it targets older youth", "in Calgary that would work well with the snowboarder", and "I like this one". - Females felt this PSA should be included.	- One participant rated as favorite. - Example comments: "clever", "good sport" and "the cartoon, doesn't fit in with an action shot". - Males gave mixed reactions about whether this PSA should be included.
	Snack Yourself Silly / Nechi Training, Research, and Health Promotion Institute	Yes	- Example comments: "it's cute", "even adults would kind of look at that and be like ha ha ha", "I like the humor in it", and "it's creative". - Females felt this PSA should be included.	- One participant rated as least favorite. - Example comments: "creative" and "veggies have jobs?". - Males gave mixed reactions about whether this PSA should be included.
	Do What Moves You: Verb / CDC	No	- Example comments: "still good but too small" and "it's kind of blurry". - Females felt this PSA should not be included.	- Example comment: "the ad jumps out at you" and "too small". - Males gave mixed reactions about whether this PSA should be included.
	Get Active / United Way of Massachusetts Bay	No	- Example comments: "doesn't grab my attention", "not very well designed" and "I think it's really plain". - Females felt this PSA should not be included.	- Example comments: "I find it confusing" and "too much going on". - Males felt this PSA should not be included.
	Get Active / United Way of Massachusetts Bay	No	Example comments: "too busy", "too many words, confusing, not professional" and "get with the times. That's what it says". - Females felt this PSA should not be included.	- One participant rated as least favorite. - Example comments: "these people look like they are stretching, not dancing" and "dancing is painful". - Males felt this PSA should not be included.
	Eat Smart Play Hard / U.S. Department of Agriculture Food and Nutrition Service	No	- Two participants rated as least favorite. - Example comments: "cartoon doesn't make sense", "childish", "lame" and "who is the panther?". - Females felt this PSA should not be included.	- Example comments: "I don't know what the Inner Panther is? Is it aggressive? I don't know what it is?" and "eating the apple – he looks strained". - Males felt this PSA should not be included.
	Do What Moves You: Verb / CDC	No	- One participant rated as least favorite. - Example comments: "unrealistic", "elementary-like", "I don't get it", "it seems to aim to more professional organizations, like join the NBA", and "it's so fake". - Females felt this PSA should not be included.	- One participant rated as least favorite - Example comments: "it's making it seem like your sport is important", "I'm not a big fan of the press" and "took a while to find the focal point". - Males felt this PSA should not be included.